

Understanding Consumers' Health Information Preferences: Development and Validation of a Brief Screening Instrument

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The impact of health communication is generally enhanced when it is targeted or tailored to the needs of a specific population or individual. In a segmentation analysis of the U.S adult population—using data from 2,636 respondents to a mail panel survey—we identified four segments of the adult population that vary significantly with regard to health information preferences based on their degree of engagement in health enhancement, and their degree of independence in health decision making. We also created a brief (10 item), easy-to-administer screening instrument that indicates into which segment people fall. The purpose of this article is to describe the segments, and the screening instrument, and to present initial tests of its validity. We believe this instrument offers a practical tool for differentiating motivationally coherent subgroups of the adult population with regard to their health information preferences, and therefore may have practical value in improving health communication and health services provision efforts. Additional research is needed to further validate the tool and test its utility in guiding the creation of targeted health messages and programs.

The recent proliferation of media channels and new information technologies, and the concomitant increase in health content moving through those channels, has

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resulted in today's consumers having greater access to health information than ever before. Increased access to health information has the potential to benefit consumers in multiple ways, including helping them make more informed decisions about health and health care (Hibbard & Peters, 2003).

In fact, better-informed consumers—other things being equal—are more likely to have improved quality of care (Brody et al., 1989), better health outcomes (Greenfield, Kaplan, & Ware, 1985; Greenfield, Kaplan, Ware, Yano, & Frank, 1988), and greater satisfaction with their care (Kaplan, Greenfield, & Ware, 1989; Williams, Weinman, & Dale, 1998). As a result, the U.S. government has established goals (U.S. Department of Health and Human Services, 2000), and members of the international health community have developed systematic efforts (Eysenback & Jadad, 2001) to ensure that all consumers have greater access to health information as a way to reduce persistent disparities in health and health care. Similarly, policymakers and health plans have embraced informed decision making for consumers as way to reduce health care costs (Agency for Healthcare Research and Quality [AHRQ], 2002a).

The importance of high-quality health information notwithstanding, not all consumers currently take steps to access available health information or wish to become involved in health care decision making. Surveys suggest that the majority of Americans, including those with chronic conditions, do not seek health information beyond their physicians (RAND Health, 2001; Tu & Hargraves, 2003). Moreover, some consumers have less preference than others for using data in health care decision making (Hibbard, Slovic, & Jewett, 1997), while others do not wish to be involved at all in their health care decisions (Robinson & Thomson, 2001). Barriers such as low literacy (American Medical Association, 1999), inability to use new technologies effectively (Rees, 1997), inaccurate information (Silberg, Lundberg, & Musacchio 1997), trust in their health care providers (Hart, Henwood, & Wyatt, 2004), and information overload (Marshall, Shekelle, Leatherman, & Brook, 2000) can limit consumers' motivation and ability to access available health information. This poses an interesting challenge for organizations interested in improving population health through the provision of information and health services. There is a pressing need for further research that elucidates consumer health information-seeking behavior and decision processes. Moreover, there is a significant need to make the increasingly available health information more usable and useful for all consumers.

Consumer Health Information Seeking

Studies have identified several correlates including demographics, environmental factors, and individual differences in information need that may influence a consumer's likelihood to seek health information (Baker, 1995; Borgers et al., 1993; Cameron et al., 1994; Connell & Crawford, 1988), but much of this research has focused on patient populations and therefore may have limited generalizability. More recently, several studies have been conducted that examine consumer health information-seeking behavior on the Internet (Silberg et al., 1997; Cline & Haynes, 2001; Dutta-Bergman, 2003, 2004). Dutta-Bergman (2004) found that consumers seeking medical information on the Internet were more likely to be health conscious, hold stronger health beliefs, and engage in health activities compared with consumers who did not search the Internet. Although Internet use is ever increasing, focusing on one information channel may limit our understanding of all consumers. Consumers continue to receive the majority of their health information from more

traditional sources (e.g., television, doctor, books, magazines, etc.), and certain consumers seek their health information exclusively from traditional sources (Gollop, 1997; Tu & Hargraves, 2003).

Segmentation Approach

We suggest that segmentation research has the potential to elucidate which consumers seek health information in support of their health care decisions, and how they use that information. Moreover, segmentation can help health program planners in their efforts to reach and effectively support consumers with the most appropriate health information (Andreasen, 1995; Maibach, Rothschild, & Novelli, 2002). Traditionally, segmentation has been conducted using demographic variables, but this has limited utility in planning health programs because of low to moderate correlations between demographic characteristics and the relevant health beliefs and behaviors (Slater, 1995). More recently, psychobehavioral segmentation using a combination of cognitive and behavioral variables has been used to segment audiences with regard to a variety of important health issues (Maibach, Maxfield, Ladin, & Slater, 1996; Slater, Basil, & Maibach, 1999; Weir et al., 2000).

We propose that consumers' orientation to health information and decision making affects their actions and interactions with the health system in important ways, and that a psychobehavioral approach to segmentation can be used to better understand these relationships on a population basis. To identify population-based patterns in orientation to health information and decision making among American adults, we conducted a segmentation analysis and created a brief and easy-to-administer screening instrument that can be used to determine into which segment people fall. The purpose of this article is to describe the four segments that were identified, and to present the screening instrument and initial tests of its validity. A validated instrument of this type should have value in enabling health care providers, administrators, communicators, and marketers to target their programs, messages, and policies to the needs and orientation of specific segments, and, as a result, create a better fit between the consumer and many facets of the health care system.

Methods

Design and Sample

The data used in this research came from Porter Novelli's¹ *HealthStyles 1999* and *2003* databases. Each year, the database is built from two mail surveys sent to a nationally representative sample of the U.S. adult population. The first survey is a general lifestyle survey and is mailed to a stratified, random sample of adults age 18 and older selected from a mail panel of more than 600,000 members. The second survey, which is focused on health issues, is mailed to those respondents who complete the initial survey. *HealthStyles* survey items are designed to provide in-depth information on adults' attitudes, behaviors, conditions, and knowledge surrounding a variety of public health issues.

In 1999, the *HealthStyles* questionnaire was mailed to those respondents who completed the initial lifestyle survey ($N = 3,362$) and to a supplemental sample of panel members from low-income and minority households ($N = 420$). The resulting response

rate was 70% ($N = 2,636$). In 2003, *HealthStyles* was mailed to the 5,845 respondents who completed the lifestyle survey, resulting in a response rate of 69% ($N = 4,035$). We conducted a segmentation analysis on the 1999 *HealthStyles* data, and evaluated the validity of the segmentation analysis using the 2003 *HealthStyles* data.

All data were poststratified and weighted according to U.S. Census benchmarks on age, sex, race/ethnicity, income, and household size to further reduce potential bias (Korn & Graubard, 1999; Lohr, 1999). Prior to poststratification, the demographics of the 1999 sample ($N = 2,636$) were 60% female, 78% non-Hispanic White, 11% non-Hispanic African American, and 8% Hispanic. Average age of respondent was 50 years old, and 61% of households had incomes under \$50,000. The sample in 2003 ($N = 4,035$) was 56% female, 70% non-Hispanic White, 13% non-Hispanic African American, and 13% Hispanic. The average respondent age was 47 years, and 54% of households had incomes under \$50,000.

Respondents who did not provide usable information on one or more of the segmentation measures were excluded from the analyses ($N = 113$ and $N = 393$ in 1999 and 2003, respectively). Respondents excluded from the segmentation analysis were not significantly different from included respondents in terms of gender or race, but were significantly older (61.7 years vs. 49.8 years, $t[2634] = 7.86$, $p < .001$) and more likely to have household incomes under \$25,000 (50.4% vs. 29.5% $\chi^2[4, N = 2636] = 29.57$, $p < .001$). Similarly, respondents excluded from the validation analyses were older than included respondents (54.6 years vs. 46.5 years, $t[436] = 9.75$, $p < .001$) and more likely to have household incomes under \$25,000 (45.3% vs. 27.3%, $\chi^2[4, N = 5,873] = 59.79$, $p < .001$).

Measures

Using social cognitive theory (Bandura, 1986) as a conceptual framework, survey items were developed to assess behaviors, environmental factors, expectancies, self-efficacy, and other cognitions that are relevant for health decision making. Specifically, 38 5-point Likert-scale items (strongly disagree=1 and strongly agree=5) were used to measure five cognitive and behavioral domains that assess how respondents interact with health information and make health decisions. The five domains measured follow: (1) self-efficacy for finding and using health information, (2) prevention orientation, (3) relationship with health care provider, (4) perceived importance of health information, (5) health information-seeking behavior.

Segmentation Analysis and Data Reduction

The purpose of the analysis was twofold: to identify a limited number of motivationally coherent segments of people in the population based on the five domains mentioned above, and to subsequently identify a small subset of the segmentation variables that can classify respondents into the correct segment with reasonable accuracy. Initially, a hierarchical agglomerative cluster analysis using the squared Euclidean distance measure within the average linkage method was conducted with the 38 items. The hierarchical agglomerative method is a widely used clustering technique (Everitt, 1993), which begins by considering each observation as a separate group; the two most similar groups (i.e., nearest neighbors in multivariate space based upon their data profiles) are then joined into a new group. The next most similar groups are then joined, and so on. Clustering ceases when a disproportionately large distance is required to continue

Table 1. A representation of the segments resulting from the 10-item screening instrument

Degree of independence in health decision making	Degree of engagement in health enhancement	
	High	Low
High	Independent actives	Independent passives
Low	Doctor-dependent actives	Doctor-dependent passives

cluster formation, implying that groups of observations are too dissimilar from one another for further combination; the resulting clusters of like observations are then interpreted as the clusters of interest. In the current study, results from the cluster analysis produced a five-cluster solution with four distinct clusters and a fifth “hybrid” cluster primarily composed of respondents scoring near the mean on most items.

We then conducted exploratory research to identify the smallest subset of the 38 items that could be used to classify respondents into their correct segment with reasonable accuracy. Using discriminant analysis, we identified 10 items that resulted in 77% accuracy in predicting cluster assignment.

Cluster analysis is an exploratory technique, with the number of optimal clusters being subjective, but a key goal is to maximize differences between clusters relative to within clusters (Hartigan, 1975). Therefore, we decided to redistribute members of the hybrid cluster back into whichever of the four distinct clusters they most closely resembled. Specifically, using the 10 items for the respondents in the four distinct clusters, a linear discriminant function analysis (DFA) was computed in order to derive Fisher’s classification functions for classifying individuals (one function per cluster). These functions then were applied to the individuals from the hybrid cluster, thereby reassigning each person to one of the four distinct cluster designations to which she or he was most similar.

The resulting four segments revealed people who have pronounced differences in how they seek out health information and interact with the health care system. At the most general level, the segments differ markedly across two major dimensions: their degree of engagement in health enhancement (high or low), and their degree of independence in health decision making (high or low). For ease in thinking about and referring to these segments, each segment was given a working title. Individuals with a *high* degree of engagement in health enhancement and a *high* degree of independence in health decision making were labeled as *independent actives*. Individuals with a *high* degree of engagement in health enhancement but a *low* degree of independence in health decision making were labeled as *doctor-dependent actives*. Individuals with a *low* degree of engagement in health enhancement but a *high* degree of independence in health decision making were labeled as *independent passives*. Finally, individuals with a *low* degree of engagement in health enhancement and a *low* degree of independence in health decision making were labeled as *doctor-dependent passives*. Table 1 presents each of the segments.

Validation Analyses

To examine the construct and criterion validity of the 10-item screening instrument, the 2003 *HealthStyles* survey data were analyzed. Chi-square and analysis of

variance (ANOVA) were conducted to compare the four segments on a range of attitudinal and behavioral measures from the 2003 data. Student Neuman-Keuls post hoc tests were conducted to determine which groups significantly differed from one another. The results of these analyses are presented in Tables 3 through 6; variables measured as percentages were assessed with chi-square analyses, and variables measured as means and standard deviations were assessed with ANOVA tests.

Results

Description of the Segments

The characteristics of segment members with regard to the 38 measures used in the cluster analysis, including the 10 items identified for use in the screening instrument, are presented in Table 2. In brief, *independent actives* place a high value on health information and prevention efforts, and report a high degree of self-efficacy for understanding health information. They consider their doctors to be reliable sources of information, and they work collaboratively with their doctors, but nearly all retain health decision-making authority for themselves. *Doctor-dependent actives* also place a great deal of importance on their health and having health information, although many find health information difficult to understand. The majority of these individuals work collaboratively with their doctors, but most also depend on their doctors to make decisions about their health.

Independent passives are markedly less engaged in prevention than members of any other segment, and they tend not to seek out health information. They are the least likely to have a collaborative relationship with their doctors, and they are the segment most likely to retain health decision making authority for themselves. *Doctor-dependent passives* are also less involved in prevention and health information, and are the segment most likely to have difficulty understanding health information. Relatively few indicate that they have collaborative relationships with their doctors; rather, they tend to depend on their doctors to make health care decisions for them.

The four segments differ with regard to a number of demographic characteristics. *Independent actives* are the most likely to be female, college educated, and have higher incomes, with 25% having household incomes of \$75,000 or more. *Doctor-dependent actives* are the oldest, less likely to be college educated, more likely to be African American, and have lower household incomes. *Independent passives* are the youngest group, more likely to be male and White, while the *doctor-dependent passives* skew male and are less likely to have a college education. Table 3 presents more complete demographic descriptions of the segments.

Each segment represents at least 20% of the adult population. The estimated population prevalence of each segment in 1999 and 2003, respectively, are independent actives (30.6% and 27.1%), doctor-dependent actives (22.9% and 20.7%), doctor-dependent passives (26.3% and 20.0%), and independent passives (20.2% and 32.1%).

Construct Validity

To examine construct validity of the 10-item screening instrument chi square and ANOVA were conducted to compare the four segments on a number of attitudinal

Table 2. Percent agreement with cognitive and behavioral measures based on 1999 HealthStyles¹

Domain and item	IA	DDA	DDP	IP
Prevention Orientation				
Living life in best possible health is important to me	85.6%	87.0%	62.2%	50.2%
Eating right, exercising, & preventive measures will keep me healthy	83.4	83.7	66.0	57.9
Living a long life is very important to me	79.5	84.9	74.0	64.8
My health depends on how well I take care of myself	87.7	93.4	82.1	74.3
<i>I try to understand my personal health risks*</i>	97.6	95.8	64.6	51.6
<i>I actively try to prevent disease and illness*</i>	91.9	94.0	46.5	30.4
I do everything I can to stay healthy	72.9	82.1	41.9	31.9
I wish I had more control over my health	37.4	60.2	48.4	31.7
Relationship with Health Care Provider				
<i>I leave it to doctor to make right decisions about my health *</i>	5.7	67.9	44.4	4.4
<i>I rely on doctor to tell me everything I need to know to manage my health*</i>	8.9	75.7	29.7	3.3
My doctor is a good source of information on health issues	80.6	91.8	68.8	47.7
<i>I work together with doctor to manage my health*</i>	68.7	80.6	30.1	16.9
<i>When I read/hear something relevant to my health, I bring it up with my doctor*</i>	73.9	80.6	36.4	21.6
I make sure my doctor answers questions in ways I understand	91.0	88.8	62.5	60.9
I have a good relationship with my health care provider	82.4	88.3	50.7	34.2
I often don't understand the language my doctor uses	10.6	27.6	33.4	23.1
My doctor provides me with practical health information	75.0	86.9	46.8	28.5
I discuss all possible treatment options with my doctor before deciding on a treatment	82.5	85.6	54.1	45.2
Self-Efficacy for Health Information				
I am able to find good health information	70.6	62.0	40.3	42.9
I never find good answers to my health questions	9.4	19.3	17.5	9.1
I enjoy learning about health issues	68.4	59.3	23.8	16.1
<i>Most health issues are too complicated for me to understand*</i>	3.0	22.9	29.1	8.9
I am overwhelmed by amount of health information available to me	21.3	42.1	27.2	22.3
<i>I have difficulty understanding health information that I read*</i>	6.5	31.4	33.6	17.0

(Continued)

Table 2. Continued

Domain and item	IA	DDA	DDP	IP
Perceived Importance of Health Information				
I would like more TV shows to use health issues in their storylines	35.6	39.5	22.4	17.7
<i>It is important to be informed about health issues*</i>	95.7	90.6	40.0	32.6
Media spends too much time on coverage of health issues	3.3	11.1	15.8	12.6
To be and stay healthy, it's critical to be informed about health issues	83.1	79.4	41.2	31.2
I feel better if I can confirm a health recommendation from several sources	73.2	66.7	43.2	43.7
The amount of health information available today makes it easier to take care of my health	81.4	74.0	43.2	35.4
<i>I need to know about health issues so I can keep myself and my family healthy*</i>	92.3	85.5	42.0	40.2
Health Information Seeking Behavior				
I don't have time to bother learning a lot of health information	9.8	15.0	23.0	14.2
I make a point to read/watch stories about health	63.5	50.8	20.7	20.1
I don't pay attention to health information unless it's about a problem I have	11.2	23.0	39.1	24.7
When sick, I try to get information about my disease	86.0	85.0	53.3	43.6
I like to get health information from a variety of sources	85.5	64.0	44.4	49.6
When I take medicine, I try to get as much information about benefits and side effects	91.1	90.2	58.9	50.0
Before making a decision about my health, I find out everything I can about this issue	82.9	80.0	43.0	33.7

¹ Respondents indicated their agreement using a 5-point scale (1=strongly disagree, 5=strongly agree) for all items. Percents presented here represent combined responses for agree and strongly agree. All chi squares were significant at $p < .001$.

*Represents one of the measures from the 10-item screening instrument.

Note: IA = independent actives, DDA = doctor-dependent actives, DDP = doctor-dependent passives, and IP = independent passives.

and behavioral measures. The pattern of these results is consistent with the general description of these segments as given above. A detailed summary of the findings is discussed below and presented in Table 4.

Independent actives were more likely than members of the other segments to show characteristics consistent with health opinion leadership. They were the most likely to believe that they know more about health and nutrition than others, and

Table 3. Demographic characteristics of the four segments¹ (1999)

Item	IA	DDA	DDP	IP	<i>p</i>
Age (mean/sd)	44.1(15.4) ^a	52.1(17.7) ^b	42.8(15.9) ^a	38.3(14.0) ^c	<.001
Female	65.3%	53.2%	43.7%	40.0%	<.001
Race/ethnicity					
White	77.5%	73.3%	78.7%	80.9%	<.001
African American	13.7%	16.0%	10.3%	7.8%	
Hispanic	8.8%	10.7%	11.0%	11.2%	
Education					
High school or less	24.1%	49.1%	46.5%	33.7%	<.001
Some college	31.5%	30.3%	28.5%	32.9%	
College degree+	44.4%	20.5%	24.9%	33.3%	
Household income					
Less than \$25K	24.8%	39.5%	31.4%	35.9%	<.001
\$25–\$49K	28.0%	33.5%	33.4%	26.3%	
\$50–\$74K	22.0%	13.4%	19.1%	19.7%	
\$75K+	25.3%	13.6%	16.1%	18.1%	
Marital status					
Married	66.8%	61.1%	67.3%	66.7%	<.001
Widowed	5.4%	11.1%	4.8%	2.1%	
Divorced/separated	10.4%	11.5%	9.0%	7.6%	
Never married	17.4%	16.3%	18.8%	23.6%	
Metro region					
Rural	18.5%	21.3%	23.6%	22.0%	.33
Urban	29.9%	30.6%	28.7%	27.9%	
Suburban	51.6%	48.1%	47.8%	50.1%	

¹ Demographic profiles are based on the 1999 *HealthStyles* data.

Note: Variables reported as percentages reported were tested with chi-square analyses; variables reported as means and standard deviations were tested with ANOVA. Mean with similar superscripts do not significantly differ from one another; means with differing superscripts significantly differ from one another.

that their friends and relatives looked to them for the latest health information. Both *independent actives* and *doctor-dependent actives* were more likely to actively seek health information and report having relatively more conversations with people about healthy eating in the past 7 days compared with the other segments. As would be predicted, however, *doctor-dependent actives* were much more likely to use their doctor as the primary source for health information, while *independent actives* were more likely to use a variety of sources (e.g., doctor, Internet, other health and fitness magazines).

Independent passives and *doctor-dependent passives* were less likely to seek health information across all sources (e.g., doctor, other people, magazines, etc.) compared with the two active segments. Although both passive segments used doctors less for health information compared with the other segments, *doctor-dependent passives* were more likely to rely on their doctors as an information source than *independent passives*.

Table 4. Health attitudes and information-seeking behavior by segment

Variables	IA	DDA	DDP	IP	p
Percent who use their doctor for health information	75.2%	91.5%	68.6%	42.0%	<.001
# of people talked to in last 7 days about healthy eating (mean/sd)	2.2 (4.5) ^a	2.5 (8.2) ^a	1.1 (2.6) ^b	1.2 (2.3) ^b	<.001
I look for health/nutrition information online (% yes)	35.0%	18.7%	10.4%	16.1%	<.001
Frequency of Internet use for health information					<.001
Every day	2.6%	2.0%	2.1%	1.3%	
A few times a week	11.8%	8.6%	3.1%	4.3%	
Several times a month	21.1%	11.7%	7.9%	11.0%	
Once a month	14.8%	9.5%	12.8%	12.7%	
A few times a year	26.6%	18.7%	27.0%	36.3%	
Never	23.2%	49.5%	47.0%	34.5%	
Magazines read regularly (% yes)					
<i>Prevention</i>	5.4%	6.5%	2.7%	2.1%	<.001
Other health/fitness mg.	12.3%	7.4%	4.4%	5.7%	<.001
% Agree/strongly agree					
It's important to me that I look healthy	85.5%	87.6%	61.0%	59.5%	<.001
I know more about health & nutrition than others	58.4%	40.9%	14.2%	20.0%	<.001
Friends and relatives look to me for latest health information	29.0%	20.2%	5.7%	7.6%	<.001

Note: Variables given as percentages reported were tested with chi-square analyses; variables reported as means and standard deviations were tested with ANOVA. Means with similar superscripts do not significantly differ from one another; means with differing superscripts significantly differ from one another.

Criterion Validity

To examine criterion validity of the screening instrument chi-square analysis and analysis of variance were conducted to compare the four segments on a number of behavioral measures of preventive action. A summary of the findings is discussed below and profiles of the segments are presented in Table 5.

Overall, the patterns of criterion beliefs and behaviors are largely consistent with the profiles as already described, with two notable exceptions: Body mass index did not vary significantly among the four segments; and *independent actives* reported getting less physical activity than did *doctor-dependent actives*.

Results indicate that *independent actives* had the highest levels of fruit and vegetable consumption, and were most likely to consistently limit their daily caloric intake to maintain their current weight or lose weight. These findings are consistent with the high value placed on prevention by *independent actives*. In addition, consistent with their preference to use multiple health information sources, *independent actives* were more likely to report a greater number of visits to medical specialists and mental health providers during the previous year. *Doctor-dependent actives* had more lifestyle-related chronic health conditions and reported more frequent visits to their primary care doctor in the previous year than other segments. They were also, however, the group most likely to consider the health benefits when making food selections, to have received a cholesterol test recently, and to get the recommended amount of daily physical activity. These findings are consistent with the notion that *doctor-dependent actives* rely on their health care provider and are therefore potentially more compliant with their doctor's recommendations for diet, exercise, and standard health screening tests.

Doctor-dependent passives were more likely to visit a health care provider and receive health tests the previous year as compared with *independent passives*. Similar to the *doctor-dependent actives*, the *doctor-dependant passives'* reliance on their doctors may increase their likelihood of receiving standard screening tests (e.g., blood pressure, cholesterol) prescribed by their physician. *Independent passives* reported the fewest number of chronic health conditions compared with other segments. They also reported the least amount of physical activity per day, however, and were less likely to select foods based on their health benefits, which may have detrimental implications for their health in the future. Not surprisingly, they were the group least likely to have seen a health care provider during the previous year or to have received any health screening tests.

Media Use

Differences in media habits among the four segments were examined using the 2003 data, and are reported in Table 6. There appear to be only modest differences in media use by segments. Overall, *doctor-dependent actives* were significantly more likely to read and *independent passives* were less likely to read the newspaper compared with the other segments. The two active segments appear to be more likely than the two passive segments to read the national news, food, and lifestyle/health health sections of the newspaper. *Independent passives* appear most likely to read the sports section.

The two "doctor-dependent" segments watch more television, on average, than the two "independent" segments, and *doctor-dependent actives* appear more inclined

Table 5. Current health status/behavior by segment

Variables	IA	DDA	DDP	IP	<i>p</i>
Total fruits and vegetables consumed yesterday (mean/sd)	4.7 (2.6) ^a	4.4 (2.9) ^b	3.4 (2.4) ^c	3.4 (2.3) ^c	<.001
Total min. per day moderate and vigorous physical activity (mean/sd)	26.1 (36.6)	25.7 (42.7)	23.2 (45.5)	25.0 (44.4)	ns
Doctor visits in past year (mean/sd)					
Primary care doctor	3.4 (4.8) ^a	4.2 (4.4) ^b	2.8 (3.4) ^c	2.1 (2.8) ^d	<.001
Specialist	2.2 (5.9) ^a	2.3 (3.4) ^a	1.6 (3.1) ^b	1.0 (2.2) ^c	<.001
Mental health provider	1.1 (4.7)	1.2 (4.7)	0.8 (4.5)	0.8 (4.2)	ns
Length of time since blood pressure check:					
Never	0.4%	1.0%	0.1%	0.4%	<.001
Within past 6 months	85.2%	87.0%	78.8%	69.5%	
Within past year	9.5%	8.3%	12.6%	16.3%	
Within past 2 years	3.1%	3.1%	5.6%	6.9%	
Within past 5 years	1.1%	0.4%	1.4%	4.6%	
More than 5 years ago	0.7%	0.3%	1.4%	2.3%	
Last cholesterol check:					
Never	7.7%	6.2%	13.2%	26.0%	<.001
Year ago or less	67.2%	78.5%	59.1%	41.0%	
1–2 years ago	12.8%	9.0%	12.3%	12.0%	
2–3 years ago	5.1%	2.7%	5.7%	9.2%	
3–5 years ago	3.8%	1.5%	5.1%	5.7%	
More than 5 years ago	3.4%	2.0%	4.6%	6.1%	

Consistently limit daily calorie intake to maintain current/lose weight:					
Yes, for 6 or more months	35.6%	27.8%	17.9%	18.8%	<.001
Yes, less than 6 months	14.7%	15.3%	11.0%	12.3%	
No, intend to next 30 days	13.4%	11.8%	13.5%	10.3%	
No, intend to next 6 months	10.2%	11.6%	14.4%	12.8%	
No, don't intend to next 6 months	26.1%	33.4%	43.2%	45.8%	
Important considerations when choosing foods					
Lowering cancer risk	63.5%	73.4%	39.3%	29.7%	<.001
Lowering heart dis. risk	68.3%	78.6%	43.8%	32.0%	<.001
Lowering diabetes risk	60.4%	72.4%	40.9%	27.3%	<.001
Living longer	74.2%	82.7%	51.7%	41.4%	<.001
Managing weight	73.6%	76.0%	49.6%	43.4%	<.001
BMI (mean/sd)	27.4 (6.6) ^a	29.0 (7.3) ^b	28.3 (6.6) ^c	28.1 (6.6) ^c	<.001
Total chronic conditions* (mean/sd)	0.7 (1.0) ^a	1.2 (1.1) ^b	0.7 (1.0) ^a	0.4 (0.7) ^c	<.001

*Sum of diabetes, osteoporosis, high cholesterol, high blood pressure, and chronic heart disease.

Note: Variables given as percentages reported were tested with chi-square analyses; variables reported as means and standard deviations were tested with ANOVA. Means with similar superscripts do not significantly differ from one another; means with differing superscripts significantly differ from one another.

Table 6. Media use and preference by segment

	IA	DDA	DDP	IP	P
Newspaper					
Days per week read a newspaper	4.1 ^b (2.7)	4.6 ^c (2.7)	3.9 ^b (2.7)	3.3 ^a (2.7)	< .001
Newspaper sections likely to read (% yes)					< .001
Front page	87.5%	85.2%	81.1%	81.5%	< .001
National news	61.7%	57.6%	46.8%	48.8%	< .001
Local/metro news	75.8%	72.6%	67.4%	67.7%	< .001
Sport section	27.7%	33.7%	35.6%	34.9%	< .001
Business section	38.9%	31.0%	27.6%	28.4%	< .001
Editorial section	35.2%	35.0%	22.3%	22.9%	< .001
Food section	42.4%	37.1%	24.5%	23.7%	< .001
Entertainment section	45.2%	40.9%	38.8%	39.9%	< .01
Lifestyle/health section	46.1%	35.3%	23.5%	26.9%	< .001
Travel section	29.6%	23.5%	17.3%	19.2%	< .001
Comics	47.4%	47.7%	44.2%	45.0%	ns
<i>Parade</i> magazine	44.9%	40.4%	31.6%	31.2%	< .001
Other magazine supplement	37.8%	40.1%	32.5%	31.7%	< .001
Advertising supplement	65.0%	61.9%	56.3%	57.6%	< .001
Television					
Hours per week watch television	17.8 ^a (15.9)	24.7 ^c (21.3)	21.7 ^b (17.5)	17.5 ^a (14.8)	< .001
Show types watch at least once a week (% yes)					< .001
Talk shows	27.8%	40.4%	36.1%	25.1%	< .001
Local/national news	75.9%	76.9%	71.4%	71.0%	< .001
Entertainment news	20.9%	26.0%	21.4%	22.3%	< .05
Home/garden shows	28.8%	23.0%	20.0%	24.7%	< .001
Soap operas	18.0%	29.2%	21.8%	15.8%	< .001
Sports	28.4%	39.7%	38.6%	34.5%	< .001
Sitcoms	52.6%	47.1%	55.9%	61.0%	< .001
Dramas	53.1%	49.8%	47.0%	48.4%	< .001
Travel shows	11.9%	14.2%	10.9%	10.5%	< .05

Game shows	25.2%	41.8%	34.3%	23.6%	<.001
Made for TV movies	30.6%	40.1%	27.5%	23.5%	<.001
Reality TV	23.1%	22.0%	33.3%	31.1%	<.001
Music channels	16.0%	23.9%	23.4%	22.6%	<.001
Health shows	10.3%	12.1%	4.3%	4.7%	<.001
Cooking shows	26.0%	26.1%	18.9%	20.2%	<.001
Weather	38.2%	46.4%	40.4%	31.9%	<.001
Local community programming	13.6%	20.9%	14.7%	10.1%	<.001
Radio					
Hours per week listen to the radio	11.0 ^a (14.7)	10.5 ^a (15.2)	12.6 ^b (15.9)	12.3 ^b (16.6)	<.01
Radio station types preferred (% yes)					
All news	24.2%	19.7%	17.1%	19.3%	<.001
Classical	14.2%	9.9%	6.5%	7.0%	<.001
Country	22.0%	29.2%	32.2%	28.4%	<.001
Oldies	31.2%	35.7%	31.2%	26.9%	<.001
Easy listening	29.0%	29.2%	23.3%	19.5%	<.001
Urban contemporary	5.2%	4.2%	3.6%	6.3%	<.01
Religious/Gospel	16.2%	19.4%	10.5%	11.2%	<.001
Alternative/Progressive rock	15.0%	8.3%	14.2%	22.1%	<.001
Jazz	13.2%	10.3%	9.1%	7.6%	<.001
Classic rock	25.6%	18.5%	25.2%	32.7%	<.001
Hard rock	9.1%	9.9%	12.5%	18.4%	<.001
Pop/top 40	25.4%	18.2%	26.1%	32.1%	<.001
Rhythm & blues	13.2%	15.7%	11.4%	10.4%	<.001
Sports programs	8.6%	8.5%	10.3%	10.7%	ns
Talk/call-in radio	26.1%	20.2%	21.3%	23.9%	<.001
Spanish	2.4%	4.7%	3.6%	3.1%	<.01

Note: Variables given as percentages reported were tested with chi-square analyses; variables reported as means and standard deviations were tested with ANOVA. Means with similar superscripts do not significantly differ from one another; means with differing superscripts significantly differ from one another.

than others to watch talk shows, and local programming. The two “passive” segments appear to watch more reality Television than members of the “active” segments.

Doctor-dependent passives and *independent passives* are slightly heavier consumers of radio than are *independent actives* and *doctor-dependent actives*, although *independent actives* appear most likely to listen to all news radio stations. *Independent passives* appear particularly likely to listen to rock and pop formats, and *doctor-dependent passives* are the segment most likely to listen to country.

Discussion

Summary of Findings

Our findings support the idea that there are clear group differences in how consumers value, understand, and access health information. Using a psychobehavioral approach to segmentation, we identified four distinct groups and developed a 10-item screening instrument that classifies people into these segments. Two of these segments—*independent actives* and *doctor-dependent actives*—value health information and are actively trying to maintain their health. *Independent actives*, however, are more self-efficacious with regard to understanding health information, and therefore they are more likely to consult multiple sources (e.g., doctors, Internet, books, etc.) when making health decisions. In contrast, *doctor-dependent actives* are more likely to rely on their doctor as their primary health information source, presumably because they are less confident about their ability to understand health information. The other two segments—*independent passives* and *doctor-dependent passives*—are markedly less engaged in prevention efforts and are less likely to seek health information. *Doctor-dependent passives* are more open to health information provided by their doctors than *independent passives*, who have little communication with health care providers.

The primary utility of any segmentation framework is to provide guidance in program planning, communications, and delivery of health services. This becomes particularly important for “hard-to-reach” audience segments, such as *independent passives* and *doctor-dependent passives*, among whom special efforts are needed to make health information relevant. Our results shed light on how to improve health communication efforts targeting these groups. For example, low health literacy is likely to be an important barrier for *doctor-dependent passives*, who tend to be less educated and report having the most difficulty understanding health information compared with the other segments. Therefore, health information for this group should be tailored to their literacy level, and because the majority of this segment relies on their health care provider, information dissemination may be most effective in a primary care setting. In contrast, barriers for *independent passives* are more likely related to their attitudes and beliefs and about their health and the health care system. This segment is younger, reports fewer chronic health conditions, and is less likely to value or seek health information. Finding ways to make health information more relevant for them is the key to reaching this group. In addition, because this group is less likely to rely on a health care provider, interventions developed for this segment need to be disseminated through other channels, such as mass or interactive media, or secondary audiences (e.g., spouse).

Rock and pop radio formats, in particular, are well suited for reaching members of this segment.

Relevance

In recent years, health care has been moving toward a patient-centered model and away from a disease-centered model. A patient-centered model requires individuals to become active participants in their own care, and receive services designed to focus on their personal needs and preferences (AHRQ, 2002b). Although people have more information today about diseases and treatment options than ever before, they do not necessarily have the ability or tools to decide among their various choices (AHRQ, 2002b). Therefore, the challenge is not just to provide accurate and comprehensive health information to all consumers, but also to tailor the information so that it becomes useful and results in better decision making about their health and health care (Hibbard & Peters, 2003).

The most apparent and overlooked reality concerning health program development is that in order for it to be effective, it has to be consumer centered. In order to be truly consumer centered, health information, related services, and care must be developed from the outset to meet the needs and suit the environment and culture of the consumer (Andreasen, 2002). Studies repeatedly find tailored health materials to be more effective than generic health materials (Kreuter, Oswald, Bull, & Clark, 2000; Kreuter & Holt, 2001). A consumer-centered system also directly benefits members of the health care team by providing them with a better understanding of their patients, which helps them build better relationships, resulting in greater trust, less malpractice litigation, improved "bedside manner," higher rates of treatment compliance, and improved health outcomes.

If we are committed to building a health care system that centers on quality, then awareness of consumers' preferences and styles when interacting with the health care system cannot be overlooked. Awareness of these differences and their implications for effective communication and dialogue to improve better health can prove useful (McGee & Cegala, 1998). An example of this would be a health plan that sends tailored educational or enrollment materials to members based on results of a simple segmentation questionnaire (Rimer & Glassman, 1998; Rimer & Glassman, 1999), or a clinic that routinely matches up new patients with a provider trained or naturally skilled in communicating with a particular consumer segment type (Weir et al., 2000).

We believe that a practical segmentation framework, based on an easy-to-use brief screening instrument, can facilitate a consumer-centered approach in health care. The screening instrument developed through our research offers a practical and potentially important tool for differentiating different motivationally coherent subgroups of the adult population with regard to health information and actions. The 10-item instrument and corresponding classification algorithm are available on the web for readers' evaluation and use (www.porternovelli.com/surveytool.html). Additional research is needed to further validate this screening tool and to test its utility in guiding the creation of targeted health programs and messages. Currently, we are examining the applicability of this tool in a primary care setting (Wolff, Massett, Mockenhaupt, Hassmiller, & Maibach, 2005). We encourage others to evaluate this tool, and perhaps of greater importance, to develop other brief,

easy-to-use screening instruments that potentially can improve the quality and effectiveness of future health communication and programming efforts.

Limitations

Researchers historically have viewed surveys based on panel research, such as the one used in this article, as inferior to surveys based on random digit dialing (RDD). Recent research, however, has begun to indicate that technological advances in the telecommunications industry (e.g., caller ID) and increased refusal rates for telephone surveys may have reduced or eliminated the reliability and validity gap between these methodologies (Curtin, Presser, & Singer, 2005; Pollard, 2002; Tuckel & O'Neill, 2002). Basil, Weber, and Basil (2005), for example, compared the National Cancer Institute's 2003 HINTS I RDD survey with Porter Novelli's 2003 *ConsumerStyles* panel survey and concluded that there was a high degree of comparability of the two methods. These findings notwithstanding, some researchers may continue to be concerned about the use of mail panel surveys in health communication research.

A limitation of greater concern to us is that although we developed our screening instrument using a well-supported theoretical framework (i.e., social cognitive theory), the actual segmentation analysis and subsequent decision to redistribute members of the hybrid cluster into one of the remaining four segments were data driven and largely subjective processes. We therefore consider our findings to be preliminary and recognize that further research is needed to strengthen the validation of the screening instrument.

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