Direct-to-Consumer Prescription Drug Advertising: Understanding Its Consequences

by

Jisu Huh and Lee B. Becker

James M. Cox Jr. Center for International Mass Communication Training and Research
Grady College of Journalism & Mass Communication
University of Georgia
Athens, GA 30602
706 542-5023
www.grady.uga.edu/coxcenter

Jisu Huh (jhuh@uga.edu) is a doctoral student in the Grady College and research assistant in the Cox Center. Lee B. Becker (lbbecker@uga.edu) is director of the Cox Center.

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Introduction

Since 1985, when the FDA lifted the ban on Direct-to-Consumer (DTC) prescription drug advertising, advertising spending by the pharmaceutical industry has increased tremendously. Especially after the FDA's revision of regulations in 1997, which opened the gate for pharmaceutical marketers to do DTC prescription drug advertising on television, DTC drug advertising expenditures have skyrocketed (Davis, 2000).

The dramatic increase in DTC advertising has generated a great deal of debate about its potential benefits and risks to the public and the healthcare system. The issues surrounding DTC prescription drug advertising involve questions of public health, corporate responsibility, advertising ethics, the consumers' ability to understand complicated medical information, and the nature of consumer responses to those advertisements.

Proponents of DTC advertising argue that DTC ads give consumers the information they need to discuss treatment options with their physicians. Indeed, some studies have provided evidence that DTC advertising may lead consumers to ask their physicians about medical conditions that they had not previously discussed. The advocates of DTC advertising claim that this type of advertising empowers consumers by educating them about health conditions and possible treatments. By doing so, it can play an important role in improving healthcare (Alperstein and Peyrot, 1993; Hollon, 1999; Siegel, 2000).

Critics contend that DTC advertising unnecessarily increases the demand for advertised drugs. Some also argue that such advertising is inappropriate because patients are not in a position to diagnose conditions or judge the relative safety, effectiveness and appropriateness of alternative treatments. In particular, healthcare professionals have raised concerns that DTC prescription drug advertising will undermine the physician-patient relationship if patients pressure physicians into prescribing advertised drug brands. This practice can lead to prescription drug misuse and abuse (Alperstein and Peyrot, 1993;

Hollon, 1999; Wilkes, Bell, and Kravitz, 2000; Siegel, 2000).

These two opposite views about DTC advertising underscore the fundamental issues faced by the public, the healthcare community, and the pharmaceutical industry. Is DTC advertising useful in the medical system? Is it harmful to patients? What impact will it have on patients and the healthcare delivery system, on the physician-patient relationship? Is DTC advertising an effective marketing tool for pharmaceutical companies?

An assessment of the merits of the various arguments about DTC prescription drug advertising and where it fits in the process of purchasing prescription drugs requires an understanding of the influence of DTC prescription drug advertising on consumers and consumer behavior. To date, only limited information is available on this topic.

A few researchers have proposed models that explain the process of consumer information processing and/or behavioral outcomes and how DTC advertising influences cognitive and behavioral outcomes. Perri and Dickson (1988) suggested the consumer information-processing paradigm as a framework for how DTC ads might affect behavior by structuring the cognitive processes occurring after exposure to an ad. Involvement, or the degree of problem-solving behavior engaged in under varying conditions of personal relevance, may influence the degree to which consumers will search for and process information. Williams and Hensel (1995) demonstrated significant relationships between peoples' attitudes toward DTC advertising and their information seeking behaviors.

Peyrot et al. (1998) also proposed a model to explain how DTC advertising works and what factors are involved. They suggested a model to study consumer prescription drug knowledge and drug brand name requesting behavior. They identified four factors that influence consumer knowledge and behavior: demographic variables, media exposure, attitudes toward DTC ads, and awareness. As a dependent variable, they measure actual drug request behavior. This study provides a good first step of building a model. It was conducted in 1990, however, and the survey respondents were regionally limited.

The study report on in this paper attempts to expand the earlier study and test previously suggested models with national sample data.

The Role of DTC Advertising in the Healthcare System

As consumers become more involved and want to play a more active role in their healthcare, they need information about diseases and treatment options and may find DTC advertising useful. Some consumer advocates believe that DTC advertising is an excellent way to meet the growing consumer demand for medical information, and it empowers consumers by educating them about health conditions and possible treatments.

From the industry point of view, DTC advertising is considered a useful tool to educate consumers about new products, enhance brand recall and brand loyalty, and reach physicians via consumer inquiries. This is more so as direct-to-physician promotion becomes more competitive and HMO's control over physician's prescribing practices increases. At the same time, the industry welcomes DTC advertising as a way to help it transform its image from simply a manufacturer of drugs to an integral part of the healthcare team.

While DTC advertising prompts more people to seek professional help, however, it does not determine the outcome of the physician visit or the kind of help patients eventually receive. Prescription drug advertising is very different from any other type of product advertising in that the product cannot be purchased without the cooperation of others (doctor, pharmacist, insurer, HMOs, etc.) and thus the purpose of advertising is different from most other product advertising. The advertisers want consumers to do one of the following: (1) seek more information; (2) talk to a doctor about the drug; (3) talk to a pharmacist about the drug; and (4) tell family and friends about the drug. Basically, what consumers are expected to do after viewing prescription ads is to seek information and talk to others.

Theories of How Advertising Works

The questions of what advertising does or what effect it has have been studied mainly in the information processing framework (Harris 1983), in which, a receiver of messages is viewed as an information processor. According to the information processing perspective, an individual receiver processes information essentially by passing it through a number of response steps (Aaker and Myers 1975).

Although there is no consensually definitive statement of information processing, a number of researchers from various disciplines have formulated similar models of advertising information processing in forms of a learning hierarchy. The hierarchy of effects model was first framed by Lavidge and Steinger in 1961. They formulated six steps consumers may go through before purchasing: awareness → knowledge → liking → preference → conviction and → purchase. Colley (1961) labeled the learning hierarchy levels as awareness → comprehension→ conviction → action. Later, McGuire (1978) developed an information processing model of advertising effects with six hierarchical stages: presentation of message → attention to message → comprehension → yielding to conclusion → retention of the belief → and behaving. These models have many similarities to each other. For instance, McGuire's concept of "yielding to the conclusion" is another term for "conviction" as found in previous models or for "attitude change" as used in other models.

The information processing model assumes that the purpose of the advertising campaign is to influence purchase behavior through all steps involved. Each of the steps in the middle can be the goal of an advertising campaign. For example, the goal of advertising may be to communicate information or to build an awareness of a specific product or a brand. In this case, only the first two or three steps would be emphasized.

Although the information-processing model provides useful insights into the likely sequence of responses of a consumer who is being influenced or persuaded by advertising, the human mind is more complex than is suggested by a simple six-step information processing model. Other factors such as the perception process, attitudes change, and the role of personal influence also need to be considered (Aaker and Myers 1975). Consumer attitude toward the ad, attitude toward the brand, and purchase intent are considered three principal outcome variables. Many studies have revealed that attitude toward the ad tends to have a strong impact on attitude toward the brand, which in turn tends to have a strong positive effect on purchase intention (MacKenzie and Lutz 1989).

Previous Research on Effects of Prescription Drug Ads

Predictors of Ad Exposure or Ad Awareness

In an attempt to determine predictors of DTC ad recognition, Perri and Nelson (1988) found that recognition of the DTC ad was a function of age, with older people showing higher recognition rates. They initially speculated that as older consumers might be more concerned about their health, they might have attended to the ad and been able to recall the ad better. Their data showed no evidence, however, that the respondent's current medical condition was a significant predictor of ad recognition. Another study by Alperstein and Peyrot (1993) showed somewhat different findings. The younger and more educated people were more aware of DTC ads for prescription drugs. Also, regular drug users were more likely to be aware of DTC ads than non-drug-users. They also found that higher levels of ad awareness was associated with more positive attitudes toward DTC advertising.

More recently, Sengupta (2002) examined what demographic variables were related to DTC ad exposure and recall rate. Female consumers showed significantly higher exposure rates than males, and females were more likely to recall advertised drugs. Another significant relationship was found between household income and ad exposure and recall of the ads. Households with higher incomes were more likely to be exposed to DTC ads and to recall brands of the advertised drugs. The relationship between age of the respondent and ad exposure was not significant.

Paths from Ad Exposure to Behavioral Outcomes

Perri and Dickson (1988) examined a relationship between DTC ad exposure and patient behavior measured in the form of drug inquiry. Applying the consumer information-processing framework, they tested factors that might influence the relationship, such as involvement and medical conditions. They conducted research through observation and a survey with patients who visited doctors after exposure to a direct mail campaign. Even though they found no significant relationship between involvement and the behavioral outcome, consumers' medical condition was significantly related to drug inquiry behavior.

Peyrot et al. (1998) created and tested a model to explain consumer prescription drug knowledge and drug brand requesting behavior. They included four factors that influence consumer knowledge and

drug request behavior: demographic factors such as age, gender, race, and socio-economic status, media exposure, attitudes toward DTC prescription drug advertising, and awareness of prescription drug advertising. The model indicates that demographic factors such as gender, income, education, and race/ethnicity significantly affect knowledge and drug requests. Attitudes toward advertising and advertising exposure moderates the influence. Media exposure increases exposure to advertising and in turn, increases knowledge and leads to drug requests. Attitudes toward drug advertising affect behavioral outcomes, but the research results showed a somewhat confusing pattern. People believing that advertising educates consumers tended to have greater drug knowledge. They also found that negative attitudes toward drug advertising were associated with greater drug knowledge.

Williams and Hensel (1995) conducted a path analysis to determine the path from DTC ad exposure to purchase. They found that educational level and health status were negatively related to attitudes towards DTC advertising and in turn, attitudes toward DTC advertising were significantly related to the intention to seek more information from a friend and a pharmacist. They did not find a significant path from exposure to visiting with a doctor, who is considered the most important information source. Everett's 1991 study showed that the less educated respondents were more likely to ask the doctor to prescribe the advertised drug.

In sum, the literature on information processing from advertising and on responses to DTC advertisements specifically argues that one of the key outcomes of exposure to those advertisements should be information seeking. That information seeking should be from both media and interpersonal sources. In addition, those who are exposed to DTC advertisements should be primed to talk with their physician about prescription drugs and should actually do so.

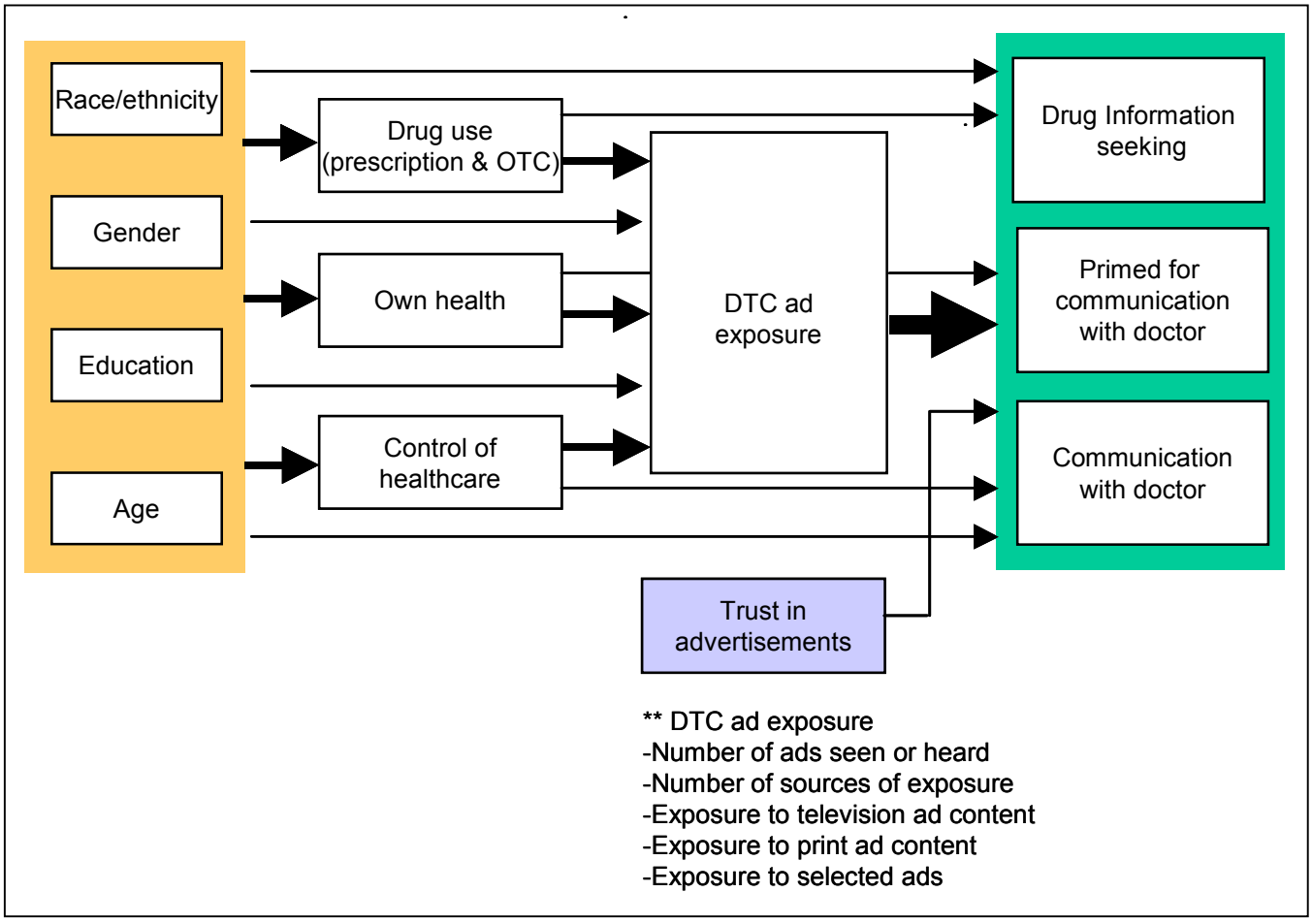
The impact of the advertisements on consumers should be moderated by the attitudes the consumers hold to DTC advertisements. Of particular importance is trust in DTC advertisements. Those high in trust and high in exposure should show stronger effects than those low in trust and exposure, and the differential should be multiplicative, not additive.

Exposure to DTC advertisements, in turn, should be greater for those already using medical drugs, both those sold over-the-counter and those sold by prescription. Healthy consumers should view

fewer advertisements than those in poor health. Those who have more control over their own healthcare should pay more attention to DTC advertisements than those who are part of managed healthcare systems. Control of one's own healthcare, one's health, and drug usage also should have direct effects on information seeking.

Such demographic factors as age, education, race and ethnicity, and gender also should have impact on information seeking directly and through their impact on exposure to advertisements and on drug usage, health, and control of healthcare. These relationships are summarized in Figure 1.

Figure 1. Paths of DTC advertising effects



Methods

Data allowing for a more robust test of this model than was possible in the past were gathered by the Food and Drug Administration's Center for Drug Evaluation and Research. The data were made available on the FDA's web site for secondary analysis. The data were gathered after the FDA revised its DTC regulations in 1997 allowing for DTC advertising on television.

In 1999, the FDA's Center for Drug Evaluation and Research contracted with Market Facts of McLean, Virginia, to conduct a telephone survey of English-speaking adults in the U.S. to ask about responses to DTC. The sample was selected using random digit dialing, and interviews were conducted between April and July. Market Facts used a screening question to identify and oversample respondents 18 years old or older who had visited a doctor in the three months prior to the interview to deal with a personal health concern.

The survey instrument contained 58 questions, including measures of exposure to DTC advertisements and potential responses to those promotions. Participants who had been to see a doctor in the last three months and who agreed to a follow-up mail survey were sent a mail questionnaire. The questionnaire included 12 DTC advertisements and asked respondents if they had seen them before receiving them as part of the questionnaire.

The total number of completed telephone interviews was 1,081. Of these, 960 were with individuals who had visited a doctor in the last three months. Since the weights for the two groups are not documented, the responses of the 960 individuals who had been to a doctor in the last three months and the responses of the 121 who had not were analyzed separately. A total of 343 completed and returned the mail survey.

Return rate, computed as completed interviews plus screened individuals who were not interviewed divided by the total number minus bad numbers, was 65%.

Measures of Independent Variables

Exposure to DTC Advertisements was measured in several ways. **Number of Advertisements** seen or heard in the last three months was measured via two questions. First, respondents were asked if they recalled seeing or hearing an advertisement for a prescription drug in the last three months. This

was followed with the question: In the last three months, how many different prescription drugs do you recall seeing advertised in any form? The count of responses was used to indicate number.

Those who had seen or heard an advertisements in the last three months also were asked if they had seen or heard these advertisements on television, on the radio, in a magazine, in a newspaper, on the internet, and in a letter, flyer or announcement in the mail. **Number of Sources of Exposure** was measured by counting the number of sources listed, from 0 (no advertisements seen or heard in the last three months) to 6 (saw or heard advertisements in all six listed sources).

Respondents who had seen an advertisement for a prescription drug in the last three months also were asked about the types of information in the television advertisements they saw. **Exposure to Television Advertisement Content** was measured by summing the positive responses to questions about exposure to the following content: benefits of the drug; direction for use of the drug; who should take the drug; questions to ask a doctor about the drug; what do do in case of an overdose; and the risks or side effects of the drug. Scores ranged from 0 (no exposure) to 6 (exposure to all six types of content).

Exposure to Print Advertisement Content was measured through the following question: Magazines and newspapers usually have small print information that gives more details about the drug. How much, if any, of the small print information would you say you usually read? (1=None; 2=Little; 3=About Half; 4=Almost All; 5=All).

Respondents to the mail survey were asked if they had seen each of the 12 advertisements included in the mailing. Responses were summed, with 12 indicating that the individual reported having seen all the advertisement before and 0 indicating that the individual had seen none of the advertisements. This was labeled **Exposure to Selected Advertisements**.

Trust in Advertisements was measured via responses to a single item in a set of questions in the instrument about advertisements. Respondents were asked to indicate their degree of agreement with the following statement: Only the safest prescription drugs are allowed to be advertised to the public. Responses were Strongly Disagree (1), Disagree Somewhat (2), Neither Agree nor Disagree (3), Agree Somewhat (4), and Agree Strongly (5).

Measures of Dependent Variables

Drug Information Seeking was measured via two items. First, respondents were asked: Has an advertisement for a prescription drug ever caused you to look for more information, for example, about the drug or about your health? Those who answered positively were read a rotated list of sources and asked if they had looked for information there. The sources were: in a reference book, in a magazine, in a newspaper, on the Internet, by asking a friend, relative or neighbor, by calling the 1-800 number in the ad, by talking to a pharmacist, by talking to your doctor, by talking to a nurse, by talking to a doctor other than your own doctor, by making an appointment with a doctor, by doing something else? Scores could range from 0 to 12.

Primed for Communication with Doctor was measured through two items. Respondents who had visited a doctor in the last three months were asked: Before you went to see the doctor for that visit, did you read, hear or see anything that made you think about a question you wanted to ask the doctor? and, Before you visited your doctor, did you think the doctor might put you on a new prescription drug? Positive responses were summed, creating an index with potential scores from 0 to 2.

Communication with Doctor was measured via five items. These were: Has an advertisement for a prescription drug ever caused you to ask a doctor about a medical condition of your own that you had not talked to a doctor about before?; Did you ask whether there might be a prescription drug to treat your condition?; Did you ask about a specific brand of prescription drug?; Did you mention an advertisement you saw or heard for a drug or bring any information about a drug with you?, and Did you ask about any/any other prescription drugs? The potential range of scores on the index was from 0 to 5.

Control Variables

Own Health was measured with the following question: Overall, would you say your health is excellent, very good, good, fair, poor. Excellent was scored as 5 and poor as 1.

Prescription Drug Use was measured via the following question: In the last six months, about how many different prescription drugs have you used? The number given was treated as the index.

Over-the-Counter Drug Use was measured via the following item: In the last six months, how many different over-the-counter drugs have you used, not including vitamins or nutritional supplements? The number given was treated as the index.

Control of Healthcare was measured as follows: Is your doctor part of either of the following healthcare arrangments: Health maintenance organization or HMO, A preferred provider list or network of physicians, or Neither? Membership of the doctor in an HMO was scored as 1, followed by PP as 2, and independent as 3.

Age was measured via a question about date of birth.

Education of the respondent was measured by asking: What is the last grade of school that you completed? Listed responses and their codes were: Grade school or less (1), Some high school (2), Completed high school (3), Some college and Other beyond high school (4), Completed college (5), and Graduate school or more (6).

Race/Ethnicity was measured by asking respondents to classify themselves in response to listed groups. These responses were collapsed to White (1) and Other (2).

Gender was coded as male (1) and female (2).

Results

The zero order relationships among the variables in the model are shown in Table 1. The three dependent variables – **Drug Information Seeking, Primed for Communication with Doctor, and Communication with Doctor** – are strongly correlated. Relationships also are found among the five variables constituting DTC advertising exposure. As predicted in Figure 1, the DTC ad outcome and the ad exposure variables show significant positive relationships. Contrary to prediction, however, no evidence of a relationship between trust and either the ad exposure or the ad outcomes variables is found. Trust was dropped from the subsequent regression analyses. This lack of relationship may be due to the weakness in the measurement of trust. In this study, trust is measured by a single item, which is far from optimal to reflect the complex nature of trust.

Next, a series of hierarchical regression analyses examine what combinations of variables best predict information seeking/communication outcomes. As expected, exposure to DTC advertisements is

strongly related to information seeking about drugs. In fact, the four different measures of exposure to DTC advertisement as a block explain a little more than 20% of the variance in the information seeking variable, as Table 2 shows. Among the four exposure indices, all but the number of advertisements seen is a strong predictor of information seeking.

Introduction of the second block of variables – for one's own health, for use of drugs, and for amount of control over one's healthcare system – increase slightly but significantly the amount of variance explained in the information seeking dependent variable. Only prescription drug use was significant in the set, with those who use prescription drugs slightly more likely to seek information about them, even after the effects of exposure were controlled.

Introduction of the set of demographic variables of age, education, race and gender again increased significantly the explanatory power of the equation, but the gain was slight indeed. Non-white respondents and women were slightly more likely to seek information, controlling for other factors.

Those who were exposed to DTC advertisements about prescription drugs also were more likely to report going to their physician primed to communicate with the doctor (Table 2). Only about 6% of the variance was explained by exposure, however, and the number of sources of such advertisements and the exposure to print advertising content were better predictors than the other two exposure measures when all four were considered together.

The block or variables, including one's own health, drug use, and control over healthcare, makes a strong contribution to understanding respondents predisposition to communicate with the physician. The amount of variance explains jumps to nearly 17%, with use of prescription drugs being the largest single factor. Those respondents using prescription drugs reported going to the doctor expecting to communicate with her or him about drugs. The demographic block also makes a significant contribution to the explanation of variance in the **Primed for Communication with Doctor** variable, with older respondents, better educated respondents, and female respondents more inclined to be ready to communicate with the doctor.

Actual communication with the doctor is much less well predicted by exposure to DTC advertisements about prescription drugs than is either general information seeking or a readiness to talk

with the doctor about these matters (Table 2). Only 3% of the variance is explained by exposure to the advertisements. Actual interpersonal communication, in contrast with a readiness to communicate and information seeking from the media and other sources, is under the control of the physician as well as the patient, so it is not so surprising that the predictive power of the level of exposure to the advertisements by the patient would be less.

Introduction of the second block of variables–for respondent health, for respondent drug use, and for respondent control of healthcare–explains a significant amount of additional variance in **Communication with Doctor**. Both use of prescription and use of over-the-counter drugs are predictive of this communication. The demographic set of variables slightly, though significantly, improves the predictive power of the equation. Younger patients are more likely to communicate with the doctor, as are non-White respondents.

Table 3 examines the relationships between each of the four measures of exposure to DTC advertisements and their predicted antecedents. The number of advertisements for prescription drugs seen is predicted by one's own health and drug use. The healthier respondents and those who use drugs, both of the over-the-counter and prescription type, are more likely to have seen large number of DTC prescription advertisements. Additional variance in the exposure measure is explained by the four demographic factors, with education being most prominently related (positively) to exposure.

This same pattern holds for the other three exposure measures, with own health and drug use positively related to the exposure measures and education the most pronounced demographic predictor. The exception is **Exposure to Print Advertisements**, which is not related to own health or to education. This final exposure measure is the least well explained by the predictor variables generally.

Health of the respondent is negatively related to age and positively related to education. Nonwhites also report poorer health (Table 4). Both prescription and over-the-counter drug use are related to age, but older respondents are higher in prescription drug use and lower in over-the-counter drug use. Nonwhite respondents are less likely to have control over their health care than are white respondents.

These same analyses were replicated for those respondents who had not visited a doctor in the last three months as a way to test the generalizability of the findings from those who had visited a doctor recently. This group of people who had not visited a doctor in the last three months includes more males compared to the other subsample (45% male in the sample of those who had not visited a doctor in three months and 35% in the sample of those who had). Also those who had not visited a doctor in three months were younger than those who had (mean age = 43 vs. 48).

Only the **Drug Information Seeking** dependent variable was measured for this subsample. The zero order relationships show that all four advertising exposure variables are significantly related to information seeking, as found in the previous analyses. Table 5 examines predictors of information seeking and finds support for results from the other subsample, though the overall predictive power is weak. The regression equation is statistically significant and the measures of exposure to DTC advertisement explain about 14% of the variance in the **Drug Information Seeking** variable. None of the four exposure indices, however, is a significant predictor of information seeking at the level of $p<.05$. Introduction of the second block of variables – for one's own health, for use of drugs, and for amount of control over healthcare – and entering the set of demographic variables increase the predictive strength of **Number of Source of Exposure**.

Finally, another set of hierarchical regression was conducted with the respondents of the follow-up mail survey with selected 12 DTC ads. **Exposure to Selected Advertisements** was added to the group of ad exposure measures for this analysis. These results also show strong support for the relationship between exposure to DTC ads and information seeking/communication outcomes. As can be seen in Table 6, three out of five ad exposure variables – **Exposure to Television Advertisements, Exposure to Print Advertisements**, and **Exposure to Selected Advertisements** – are significant predictors of **Drug Information Seeking**, explaining 16% of the variance. Introduction of the second and third blocks does not increase the explanatory power of the regression equation significantly.

An analysis with **Primed for Communication with Doctor** produce a significant regression equation though the explanatory power is weak (R-squared = 5.8%). Introduction of the second block increases the R-squared significantly, explaining about 14% of the variance. **Number of Sources of**

Exposure and **Prescription Drug Use** are significant predictors of **Primed for Communication with Doctor**. An analysis with the **Communication with Doctor** dependent variable did not show any significant predictors at the level of $p<.05$.

Discussion

This study investigated the pathways of "how DTC advertising works" from exposure to DTC ads to information seeking and communication. These are the main expected outcomes of DTC advertising. As predicted, exposure to DTC advertising was a strong predictor of **Drug Information Seeking**, **Primed for Communication with Doctor**, and actual **Communication with Doctor**. Other factors such as drug use, own health, control over healthcare, and various demographic variables also influenced the advertising outcomes directly, but the small amount of increase in explanatory power suggested that the direct influence of these variables on final outcomes was rather weak. Most of these variables were more likely to indirectly affect the key variables through DTC ad exposure. The regression analyses demonstrated prescription drug use was a significant predictor of **Drug Information Seeking** and **Primed for Communication with Doctor**. Older and better-educated people were more likely to be ready to communicate with their doctors. Women were more likely to seek information about drugs and be primed to communicate with their doctors. As to actual communication, younger and non-white people were more prone to communicate with their doctors.

This study also showed what kind of factors contributed to exposure to DTC ads. The healthier people and current drug users were more likely to see and hear a large number of DTC ads. This appears to conflict with results of some of previous studies, which suggested that less healthy people are more likely to attend to DTC ads. One's own health was negatively related to age and positively related to education. It makes sense that young, well-educated healthy people see or hear more DTC ads in general than some less healthy people. One way to maintain health is through knowledge about drug products, which can come from DTC ads. Among demographic variables, education was the strongest predictor of ad exposure.

This study contributes to the enhanced understanding of how DTC prescription advertising works in three ways: first, it updates our knowledge about consequences of DTC ads, which has been examined

by a number of studies conducted before the 1997 FDA regulation changed; second, it provides an integrated model of how DTC advertising works while most previous studies show fragmentary pictures; third, this study tested a DTC advertising effect model with a national random sample while most previous studies were limited in terms of their sample frame (e.g., Williams and Hensel (1995) study was conducted with a small convenience sample of older adults and Peyrot et al. (1998) study was regionally limited).

The study also has important implications for pharmaceutical marketers. DTC advertising exposure is the strongest predictor of those measured consumers' information seeking and communication with their doctors. The finding that healthy people are more likely to be exposed to DTC ads suggests that pharmaceutical marketers should devise strategies to reach people with relatively poor health and thus in greater needs of prescription drugs. This study adds another challenge to advertisers that while older people were more primed to communicate, actual communication with a doctor was more likely to occur among younger people.

While the present study provides intriguing findings, there are some limitations. The single attitude measure used here, **Trust**, was not related to other key variables as expected. Such variable may be an important part of an advertising effects model. This lack of relationship may be due to the fact that trust was measured by a single measure, which did not allow for an adequate test of the role of trust in mediating the influence of ad exposure. Future research with a more comprehensive set of attitude measures could enrich a model of the DTC advertising process.

Also, the advertising outcome measures were limited to three variables regarding information seeking and communication with a doctor. It would be interesting to see whether the relationships between ad exposure and other key variables identified in this study would hold with other outcomes, such as communication with pharmacists or communication with friends.

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Table 1. Correlations Among Variables

	Drug Information Seeking	Primed for Communication With Doctor	Communication With Doctor	Number of Advertisements Seen or Heard	Number of Sources of Exposure	Exposure to Television Advertisement Content	Exposure to Print Advertisement Content	Exposure to Selected Advertisements	Trust in Advertisement	Own Health	Prescription Drug Use	OTC Drug Use	Control of Healthcare	Age	Education	Race/Ethnicity	Gender
Dependent Variables																	
Drug Information Seeking	1.00	**0.26**	**0.23**	**0.28**	**0.37**	**0.40**	**0.37**	**0.23**	**0.08**	-0.05	**0.14**	**0.14**	-0.06	**-0.07**	0.06	0.02	**0.07**
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Primed for Communication With Doctor	**0.26**	1.00	**0.30**	**0.16**	**0.23**	**0.20**	**0.19**	**0.14**	-0.01	**-0.16**	**0.34**	**0.10**	**0.07**	**0.08**	**0.12**	**-0.07**	**0.10**
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Communication With Doctor	**0.23**	**0.30**	1.00	**0.12**	**0.16**	**0.15**	**0.13**	0.02	-0.01	**-0.08**	**0.16**	**0.14**	-0.02	**-0.10**	**0.08**	0.06	0.04
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Exposure to DTC Advertisements																	
Number of Advertisements Seen or Heard	**0.28**	**0.16**	**0.12**	1.00	**0.61**	**0.55**	**0.30**	**0.18**	**-0.10**	**0.12**	**0.11**	**0.24**	-0.03	**-0.12**	**0.24**	**-0.11**	**-0.09**
N	957	957	957	957	957	957	957	343	685	954	946	954	956	957	954	940	957
Number of Sources of Exposure	**0.37**	**0.23**	**0.16**	**0.61**	1.00	**0.66**	**0.32**	**0.24**	-0.05	**0.17**	0.05	**0.20**	**-0.09**	**-0.16**	**0.30**	**-0.12**	**-0.07**
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Exposure to Television Advertisement Content	**0.40**	**0.20**	**0.15**	**0.55**	**0.66**	1.00	**0.45**	**0.30**	0.06	**0.09**	**0.07**	**0.20**	**-0.10**	**-0.18**	**0.22**	**-0.10**	-0.01
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Exposure to Print Advertisement Content	**0.37**	**0.19**	**0.13**	**0.30**	**0.32**	**0.45**	1.00	**0.19**	0.06	-0.01	**0.13**	**0.15**	**-0.09**	**-0.08**	0.05	0.00	**0.10**
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Exposure to Selected Advertisements	**0.23**	**0.14**	0.02	**0.18**	**0.24**	**0.30**	**0.19**	1.00	**0.13**	-0.04	0.10	0.04	0.07	-0.02	-0.07	0.07	**0.11**
N	343	343	343	343	343	343	343	343	275	343	340	343	343	343	343	341	343
Trust																	
Trust in Advertisement	**0.08**	-0.01	-0.01	**-0.10**	-0.05	0.06	0.06	**0.13**	1.00	-0.04	-0.04	0.02	-0.06	-0.01	**-0.11**	0.07	0.03
N	688	688	688	685	688	688	688	275	688	686	683	688	687	688	687	680	688
Control Variables																	
Own Health	-0.05	**-0.16**	**-0.08**	**0.12**	**0.17**	**0.09**	-0.01	-0.04	-0.04	1.00	**-0.45**	0.05	**-0.11**	**-0.29**	**0.30**	**-0.08**	-0.06
N	957	957	957	954	957	957	957	343	686	957	946	954	956	957	954	939	957
Prescription Drug Use	**0.14**	**0.34**	**0.16**	**0.11**	0.05	**0.07**	**0.13**	0.10	-0.04	**-0.45**	1.00	**0.10**	0.06	**0.21**	-0.05	-0.04	**0.07**
N	949	949	949	946	949	949	949	340	683	946	949	948	948	949	946	932	949
OTC Drug Use	**0.14**	**0.10**	**0.14**	**0.24**	**0.20**	**0.20**	**0.15**	0.04	0.02	0.05	**0.10**	1.00	-0.01	**-0.23**	**0.11**	**-0.08**	-0.03
N	957	957	957	954	957	957	957	343	688	954	948	957	956	957	954	939	957
Control of Healthcare	-0.06	**0.07**	-0.02	-0.03	**-0.09**	**-0.10**	**-0.09**	0.07	-0.06	**-0.11**	0.06	-0.01	1.00	**0.12**	**-0.10**	**-0.11**	-0.01
N	959	959	959	956	959	959	959	343	687	956	948	956	959	959	956	941	959
Age	**-0.07**	**0.08**	**-0.10**	**-0.12**	**-0.16**	**-0.18**	**-0.08**	-0.02	-0.01	**-0.29**	**0.21**	**-0.23**	**0.12**	1.00	**-0.16**	**-0.12**	-0.03
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960
Education	0.06	**0.12**	**0.08**	**0.24**	**0.30**	**0.22**	0.05	-0.07	**-0.11**	**0.30**	-0.05	**0.11**	**-0.10**	**-0.16**	1.00	**-0.09**	**-0.12**
N	957	957	957	954	957	957	957	343	687	954	946	954	956	957	957	941	957
Race/Ethnicity	0.02	**-0.07**	0.06	**-0.11**	**-0.12**	**-0.10**	0.00	0.07	0.07	**-0.08**	-0.04	**-0.08**	**-0.11**	**-0.12**	**-0.09**	1.00	0.04
N	942	942	942	940	942	942	942	341	680	939	932	939	941	942	941	942	942
Gender	**0.07**	**0.10**	0.04	**-0.09**	**-0.07**	-0.01	**0.10**	**0.11**	0.03	-0.06	**0.07**	-0.03	-0.01	-0.03	**-0.12**	0.04	1.00
N	960	960	960	957	960	960	960	343	688	957	949	957	959	960	957	942	960

Bold P<.10 (2-tailed)
Bold Underline P<.05 (2-tailed)

Table 2. Regression Analyses of Predictors of DTC Ads Outcomes

		Beta		
		Drug Information Seeking	Primed for Communication with Doctor	Communication with Doctor
Model 1	Number of Advertisements Seen or Heard	0.018	-0.003	0.014
	Number of Sources of Exposure	0.162 **	0.164 **	0.103 **
	Exposure to Television Advertisement Content	0.183 **	0.036	0.049
	Exposure to Print Advertisement Content	0.227 **	0.115 **	0.066 *
	Adjusted R square	0.216 **	0.059 **	0.030 **
Model 2	Number of Advertisements Seen or Heard	0.013	-0.043	-0.011
	Number of Sources of Exposure	0.179 **	0.190 **	0.114 **
	Exposure to Television Advertisement Content	0.175 **	0.039	0.041
	Exposure to Print Advertisement Content	0.210 **	0.076 **	0.041
	Own Health	-0.092 **	-0.066 *	-0.065 *
	Prescription Drug Use	0.065 **	0.288 **	0.105 **
	OTC Drug Use	0.026	0.038	0.098 **
	Control of Healthcare	-0.025	0.073 **	-0.015
	Adjusted R square	0.232 **	0.170 **	0.057 **
Model 3	Number of Advertisements Seen or Heard	0.023	-0.041	-0.005
	Number of Sources of Exposure	0.193 **	0.172 **	0.109 **
	Exposure to Television Advertisement Content	0.178 **	0.041	0.035
	Exposure to Print Advertisement Content	0.198 **	0.074 **	0.035
	Own Health	-0.074 **	-0.081 **	-0.087 **
	Prescription Drug Use	0.067 **	0.262 **	0.113 **
	OTC Drug Use	0.033	0.053 *	0.085 **
	Control of Healthcare	-0.017	0.073 **	0.003
	Age	0.004	0.085 **	-0.072 **
	Education	-0.029	0.115 **	0.058
	Race/Ethnicity	0.067 **	-0.011	0.083 **
	Gender	0.055 **	0.098 **	0.035
	Adjusted R square	0.237 **	0.190 **	0.069 **

* P<.10, **P<.05

*, ** for Adjusted R Square indicates significance of R-squared increments

Table 3. Regression Analyses of Predictors of DTC Ad Exposure

		Beta			
		Number of Ads Seen or Heard	Number of Sources of Exposure	Exposure to Television Ads	Exposure to Print Ads
Model 1	Own Health	0.179 **	0.209 **	0.118 **	0.044
	Prescription Drug Use	0.170 **	0.135 **	0.123 **	0.152 **
	OTC Drug Use	0.228 **	0.202 **	0.199 **	0.137 **
	Control of Healthcare	-0.013	-0.063 **	-0.098 **	-0.079 **
	Adjusted R square	0.094 **	0.089 **	0.070 **	0.045 **
Model 2	Own Health	0.097 **	0.100 **	0.025	0.026
	Prescription Drug Use	0.162 **	0.122 **	0.117 **	0.148 **
	OTC Drug Use	0.190 **	0.150 **	0.146 **	0.127 **
	Control of Healthcare	-0.009	-0.054 *	-0.090 **	-0.072 **
	Age	-0.064 **	-0.094 **	-0.133 **	-0.040
	Education	0.164 **	0.222 **	0.153 **	0.040
	Race/Ethnicity	-0.082 **	-0.100 **	-0.103 **	0.002
	Gender	-0.060 **	-0.031	0.021	0.087 **
	Adjusted R square	0.131 **	0.151 **	0.112 **	0.051 **

* P<.10, **P<.05

*, ** for Adjusted R Square indicates significance of R-squared increments

Table 4. Regression Analyses of Predictors of Control Variables

	Beta			
	Own Health	Prescription Drug Use	OTC Drug Use	Control of Healthcare
Age	-0.262 **	0.209 **	-0.224 **	0.088 **
Education	0.252 **	-0.016	0.083 **	-0.087 **
Race/Ethnicity	-0.103 **	-0.026	-0.124 **	-0.112 **
Gender	-0.044	0.102 **	-0.003	-0.008
R square	0.163 **	0.054 **	0.070 **	0.027 **

* P<.10, **P<.05

Table 5. Predictors of Information Seeking with Subsample of Those Who Had Not Visited a Doctor

		Beta
Model 1	Number of Advertisements Seen or Heard	0.014
	Number of Sources of Exposure	0.202 *
	Exposure to Television Advertisement Content	0.188
	Exposure to Print Advertisement Content	0.102
	Adjusted R square	0.142 **
Model 2	Number of Advertisements Seen or Heard	0.057
	Number of Sources of Exposure	0.255 **
	Exposure to Television Advertisement Content	0.113
	Exposure to Print Advertisement Content	0.129
	Own Health	-0.173 *
	Prescription Drug Use	0.061
	OTC Drug Use	-0.010
	Control of Healthcare	-0.141
	Adjusted R square	0.172 *
Model 3	Number of Advertisements Seen or Heard	0.079
	Number of Sources of Exposure	0.303 **
	Exposure to Television Advertisement Content	0.096
	Exposure to Print Advertisement Content	0.134
	Own Health	-0.114
	Prescription Drug Use	0.062
	OTC Drug Use	0.013
	Control of Healthcare	-0.138
	Age	0.026
	Education	-0.096
	Race/Ethnicity	0.103
	Gender	0.083
	Adjusted R square	0.166

* P<.10, **P<.05

*, ** for Adjusted R Square indicates significance of R-squared increments

Table 6. Predictors of DTC Ads Outcomes with Subsample of Those Who Participated in Mail-Survey

		Beta		
		Drug Information Seeking	Primed for Communication with Doctor	Communication with Doctor
Model 1	Number of Advertisements Seen or Heard	0.052	0.022	0.010
	Number of Sources of Exposure	0.048	0.112	0.062
	Exposure to Television Advertisement Content	0.220 **	0.084	0.021
	Exposure to Print Advertisement Content	0.154 **	0.087	0.054
	Exposure to 12 Selected Advertisements	0.113 **	0.081	-0.032
	Adjusted R square	0.164 **	0.058 **	0.016 *
Model 2	Number of Advertisements Seen or Heard	0.026	-0.025	0.079
	Number of Sources of Exposure	0.063	0.143 **	0.078
	Exposure to Television Advertisement Content	0.215 **	0.081	0.018
	Exposure to Print Advertisement Content	0.124 **	0.032	0.024
	Exposure to 12 Selected Advertisements	0.108 **	0.055	-0.042
	Own Health	-0.066	-0.088	-0.076
	Prescription Drug Use	0.086	0.232 **	0.094
	OTC Drug Use	0.067	0.058	0.049
	Control of Healthcare	-0.027	0.066	0.002
	Adjusted R square	0.176 *	0.136 **	0.028 *
Model 3	Number of Advertisements Seen or Heard	0.045	-0.014	0.067
	Number of Sources of Exposure	0.068	0.138 **	0.056
	Exposure to Television Advertisement Content	0.231 **	0.090	0.018
	Exposure to Print Advertisement Content	0.109	0.033	0.027
	Exposure to 12 Selected Advertisements	0.088	0.044	-0.034
	Own Health	-0.050	-0.107	-0.122 *
	Prescription Drug Use	0.076	0.213 **	0.084
	OTC Drug Use	0.065	0.051	0.040
	Control of Healthcare	-0.022	0.069	0.012
	Age	0.009	0.005	-0.046
	Education	-0.015	0.067	0.131 **
	Race/Ethnicity	0.070	-0.024	0.100 *
	Gender	0.084	0.113	-0.010
	Adjusted R square	0.178	0.140	0.069 *

* P<.10, **P<.05

*, ** for Adjusted R Square indicates significance of R-squared increments