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RESEARCH ARTICLE

WILEY Psychology Marketing

Market claims and efficacy information in direct-to-consumer prescription drug print advertisements

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Abstract

This study examined the impact of “New” and “#1 Prescribed” market claims and quantitative efficacy information on perceptions of a hypothetical prescription drug in a direct-to-consumer (DTC) print advertisement. We examined two market claims (New and #1 Prescribed), two efficacy levels (higher and lower), and a control condition without this information. Participants with diabetes were randomized to review one ad version and asked their perceptions of the ad's message, the drug's benefits, side effects and risks, doctors' opinions about the drug, and behavioral intention to use the drug, as well as recall and recognition of drug benefits and risks. Results suggest the market claim affects personal perceptions and perceptions of the ad's message about drug benefits and perceptions about doctors' opinions of the drug. Inclusion of quantitative information about product efficacy did not show a large influence on perceptions. These findings can help inform stakeholders and policy makers as they work to ensure DTC prescription drug promotion does not mislead patients.

KEYWORDS

DTC advertising, market claims, product efficacy

1 | INTRODUCTION

Direct-to-consumer (DTC) prescription drug advertisements are monitored and studied by the US Food and Drug Administration (FDA) in part due to the complexities of consumer interpretation of drug ad content. The FDA states in their *Presenting risk information in prescription drug and medical device promotion: Draft guidance* that disclosure of risks and benefits associated with medical or pharmaceutical treatment is important for informing consumer and healthcare provider evaluations of safety and efficacy of therapeutic treatments (FDA, 2009). Healthcare expansion and information access via technology has drawn in more potential patients and increased exposure to information about potential treatments and diseases, enabling consumers to have more of an active role in their healthcare decisions. Therefore, understanding consumer interpretation of DTC prescription drug advertising content is integral to adapting to the changing public health landscape in the United States.

1.1 | Intrinsic and extrinsic cues

Companies (or sponsors) may choose to promote their prescription drug products to consumers, healthcare providers, or both. The benefit and risk information in prescription drug advertising created by the company is primarily drawn from the FDA-approved product labeling for that product. However, the company marketing the drug product may also choose to include information in ads such as price and market status to promote their products, provided these claims are truthful and non-misleading. This information can be categorized as *intrinsic*, relating to the physical product, or *extrinsic*, related to product image and branding (Jacoby, Olson, & Haddock, 1971). Efficacy, dose, and risk information are intrinsic cues that may be presented in drug ads. There is an almost endless array of potential extrinsic cues, including price, packaging, and celebrity endorsement (Lee & Lou, 2001). Market claims are a particular type of extrinsic cue specific to the sales and market status of the product, such as “best-selling.” Intrinsic and

extrinsic cues in drug ads have the potential to impact consumer understanding of a drug's benefits, efficacy, and risks. In particular, extrinsic cues may be accurate in content, but consumers' understanding of claim implications may lead to misinterpretations of a drug's benefits, efficacy, and risks.

1.2 | Extrinsic cue: Market claims

Considerable work in advertising research shows that extrinsic cues can be as powerful as or more so than intrinsic cues in influencing consumer perceptions of product quality. For instance, a common finding is that price is positively correlated with perceived quality, even though price is negatively correlated with willingness to buy. In other words, controlling for other product traits, more expensive items are viewed more favorably (Dodds, Monroe, & Grewal, 1991; Teas & Agarwal, 2000). Market claims seen in DTC ads, such as “#1 Prescribed” and “New” are extrinsic cues in that they do not refer to inherent properties of the product. Importantly, while market claims such as price, drug awareness, or duration in the market do not include explicit information about efficacy, existing work indicates that such claims do impact perceptions of drug benefits. For instance, in a study of #1 Prescribed claims in DTC ads, Mitra, Swasy, and Aikin (2006) found that consumers who saw this claim perceived the product to be more effective and, when making judgments about what doctors would think, rated the brand as more effective, preferable, and trustworthy by doctors. Similarly, a comparative efficacy claim (a claim stating one drug works better than another) can increase consumers' comparative efficacy perceptions and decrease perceptions of comparative risk (O'Donoghue et al., 2014, Study 1). In both studies, consumers had no quantitative efficacy information on which to base such judgments; thus, these studies demonstrate that market claims carry drug benefit connotations, which may or may not be supported.

1.3 | Intrinsic cue: Efficacy information

Efficacy information represents a type of intrinsic cue in that it describes inherent properties of the product. Efficacy can be thought of as the observed impact of a drug on health and might be expressed in a numeric format (“78% of patients experience a reduction in symptoms”) or a descriptive form (“most patients experience a reduction in symptoms”). Supplying quantitative efficacy information helps ameliorate consumers' tendency to overestimate drug benefits (Schwartz & Woloshin, 2009; Schwartz, Woloshin, & Welch, 2011). Other studies show including efficacy information can facilitate understanding (O'Donoghue et al., 2014; Sullivan, O'Donoghue, & Aikin, 2013). Taken together, research indicates that providing consumers with efficacy information affects both comprehension and perceptions. Therefore, it is important to consider this specific intrinsic cue in the context of the overall drug ad when examining factors that impact consumer perception of prescription drugs.

1.4 | Consumer purchasing behavior

Zeithaml's “Means-End” model (1988) offers a descriptive framework of the factors, including intrinsic and extrinsic cues, that determine consumer purchasing behavior. According to the model, both intrinsic and extrinsic cues influence perceived quality of a product, which refers to the consumer's judgment of a product's overall superiority or excellence. The model also indicates that intrinsic and extrinsic cues can influence perceived value, which refers to the consumer's judgment of the monetary cost of the product. Extrinsic cues, in particular, can serve as “value indicators,” which the author theorizes is a powerful pathway to influence the final purchase decision. Because value is the ultimate determinant of the purchase, an efficient ad strategy might be to target value perceptions. Zeithaml also posits that extrinsic cues are more generalizable across brands and products than intrinsic cues.

1.5 | Consumer cost-benefit analysis

As another consideration, consumer perception and understanding of value is based on an individual's own cost-benefit analysis. According to Teas and Agarwal (2000), consumers evaluate products based on two value properties: (a) Acquisition value and (b) transactional value. Acquisition value is the net gain or tradeoff from consuming a good or service. Transactional value refers to psychological satisfaction with a financial deal. From a cost-benefit perspective, consumers perceive higher priced products to be of higher quality. Brand advertising satiates the acquisition value concept because the perceived benefits of a high-quality drug may outweigh potential, inexpensive alternatives, and justify the cost. However, consumers perceive generic drugs to be a better value than brand name drugs and few report concerns about safety or side effects of generic drugs (Shrank, Cox, Fischer, Mehta, & Choudhry, 2009). The transactional value principal can be applied to a consumer's satisfaction with a discount on a highly marketed brand name product (coupon effect), as the consumer receives a perceived high-quality good for only a fraction of the cost. Thus, positive price-quality linkages may drive consumer choice (Teas & Agarwal, 2000).

1.6 | Individual differences

The impact of market claims on consumers is not universal. Rather, a variety of individual and situational factors interact with an ad's claims. Knowledge about the product can interact with extrinsic and intrinsic information. Extrinsic factors in general yield greater impact on consumers who are less familiar with the product (Lee & Lou, 2011). For instance, name brand (extrinsic cue) carries less weight among consumers who are knowledgeable about the product category (Bettman & Park, 1980). In contrast, less knowledgeable consumers may be more influenced by extrinsic factors. A counter-intuitive exception, however, is the finding that more knowledgeable consumers are more susceptible to the effect of price (extrinsic) on product quality (Park & Moon, 2003). Involvement can also impact the effect of extrinsic and

intrinsic cues. High situational involvement is associated with less reliance on extrinsic cues, in favor of intrinsic cues (Lee & Lou, 2011). Together, these findings suggest that both knowledge and involvement promote reliance on intrinsic cues to guide decisions.

1.7 | The present study

As healthcare and medical services become more patient-driven, the importance of accurately informing consumers of the risks and benefits associated with therapies increases. The purpose of the present research is to examine the impact of both market claims and quantitative efficacy information in print advertising for prescription drugs. This builds on prior work (Mitra et al., 2006; O'Donoghue et al., 2014) to examine the interaction between market claims and efficacy information on consumers' perceptions of prescription drugs. We examined the following research questions:

Research Question 1: What effect do market claims (New or #1 Prescribed) have on perceptions of drug risks and benefits?

Research Question 2: Do perceptions vary by the presence of quantitative efficacy information, and by the efficacy level presented (a lower or higher efficacy level)?

Research Question 3: Does adding quantitative efficacy information change the impact of the market claim on perceptions of drug risks and benefits?

Research Question 4: Do demographic variables and other individual differences affect drug perceptions and intentions?

2 | METHOD

2.1 | Participants

Participants were recruited from an opt-in online panel and consisted of 525 adults who self-identified as having been diagnosed with diabetes by a doctor or healthcare provider, excluding diabetes during pregnancy (gestational diabetes). Individuals who reported working in the healthcare, marketing, advertising, or pharmaceutical industries were excluded. To get enough participants who met the above inclusion criteria, a sample of panelists ($n = 4,966$) were invited via email to participate. We provided one email reminder during the course of the survey. Of those invited, 22% ($n = 1,093$) responded to the invitation and entered the survey site. Participants first answered screener questions to determine eligibility. Eligible participants were then shown consent language and invited to continue. Ineligible participants were thanked and exited from the survey. The rate of participants who screened in and consented was 62% (see Consort Diagram below in Figure 1).

2.2 | Procedure

The study was conducted online via the Ipsos survey platform. Panelists who had been pre-identified as having diabetes were emailed a study invitation. Participants were pre-identified by self-reporting on other

FIGURE 1 Consort diagram. *Quota met refers to when the total number of participants within demographic categories are met to have a balanced sample [Color figure can be viewed at wileyonlinelibrary.com]

panel-wide demographic measures whether they had ever been diagnosed with diabetes by a physician or other qualified medical professional. After participants completed screening and provided consent, they were randomly assigned to view one of nine versions of a DTC ad for a fictitious prescription drug to treat diabetic nerve pain, Nuramen (see Appendix A). To ensure realism, the claims and the efficacy information in the ad were constructed in consultation with a regulatory review officer from FDA's Office of Prescription Drug Promotion. The introductory language read: "On the next screen, you will see an ad for a drug. The name of the drug has been changed for this study. Even though it is on a computer screen, please read the ad as if it were in a magazine. Imagine that the ad is for a product in which you might be interested."

We used several strategies to encourage participants to read all of the information in the ad: (1) The instructions encouraged participants to pay close attention to the ad because they would be asked questions about it, (2) the stimuli page included an option to enlarge the ad, and (3) participants were asked if they had problems viewing the ad. Participants who reported that they could not view the ad were terminated from the survey. After viewing the ad, participants were asked to complete an online survey which included questions about their perceptions of the product's risks and benefits and the market claim, measures of health literacy and numeracy, and demographic information.

We conducted cognitive interviews and pretesting to evaluate the comprehensibility of the measures and to refine the stimuli. The two independent variables of interest were type of market claim (#1 Prescribed, New!, or No claim) and level of efficacy information (Higher [72%], Lower [46%], or No efficacy). Efficacy information was operationalized in the form of realistic quantitative information (e.g., “46% of patients taking Nuramen felt their nerve pain reduced by at least half (50%), compared with baseline”).

2.3 | Measures

2.3.1 | Recall

Participants were asked three open-ended questions to assess recall for the main message of the ad, the benefits of the drug, and the risks and side effects of the drug. Responses were later coded for accuracy.

2.3.2 | Recognition

Participants were asked to identify “Which of the following statements, if any, were in the prescription drug ad you saw?” for the market claim and the efficacy claim. For the drug's benefits, risks and side effects, participants were asked “Read each statement and indicate whether or not each of the following was mentioned as a benefit [side effect or risk] of taking Nuramen. Even if you think a statement is true, please select “Yes” only if it was written in the ad.” Correct responses for the market claim and efficacy claim were coded 1 = correct, 0 = incorrect. Responses for the benefit claims were summed to create a score from 0 to 6. Responses for the risk and side effect claims were summed to create a score from 0 to 6.

2.3.3 | Behavioral intention

Participants rated five statements, “Based on the prescription drug ad, please rate how likely or unlikely you would be to take each of the following actions if you saw such an ad in a magazine” (1 = *not at all likely*, 6 = *extremely likely*):

- Look for information about Nuramen.
- Talk with a friend or family member about Nuramen.
- Ask your doctor for more information about Nuramen.
- Ask your doctor to prescribe Nuramen.
- Take Nuramen if your doctor prescribed it.

We created a measure of behavioral intention of these items (Cronbach's $\alpha = 0.92$).

2.3.4 | Perception measures

We measured both participants' *personal* perceptions of drug risk and benefit, and their perceptions of the *ad's message* about drug risk and benefit.

Ad risk perceptions

Participants were asked to rate their perceptions of the ad's message about risks on three items ($\alpha = 0.71$); “What is the ad's message about how serious Nuramen's side effects are?” (1 = *not at all serious*, 6 = *extremely serious*), “What is the ad's message about how likely it is that you would experience at least one side effect if you took Nuramen?” (1 = *not at all likely*, 6 = *extremely likely*), “In your opinion, what is the ad's message about the overall risk of Nuramen?” (1 = *not at all risky*, 6 = *extremely risky*).

Personal risk perceptions

Participants rated their own interpretation of the drug's risks and side effects on four items ($\alpha = 0.81$); “In your opinion, how likely is it that you would experience at least one side effect if you took Nuramen?” (1 = *not at all likely*, 6 = *extremely likely*). “In your opinion, how serious are Nuramen's side effects?” (1 = *not at all serious*, 6 = *extremely serious*), “In your opinion, do you think Nuramen's side effects would be short-lived or long-lasting?” (1 = *short-lived*, 6 = *long-lasting*), and “How would you rate the overall risk of Nuramen?” (1 = *not at all risky*, 6 = *extremely risky*).

Ad comparative risk perceptions

Participants rated their perceptions of the ad's message about the risks of the drug compared with other diabetic nerve pain drugs on two items ($\alpha = 0.89$); “In your opinion, what is the ad's message about whether the side effects of Nuramen would be less serious or more serious than other diabetic nerve pain drugs?” (1 = *much less serious*, 7 = *much more serious*), “In your opinion, what is the ad's message about whether Nuramen would have a smaller or larger number of side effects compared with other diabetic nerve pain drugs?” (1 = *much smaller number of side effects*, 7 = *much larger number of side effects*).

Personal comparative risk perceptions

Participants rated their own interpretation of the comparative risks of the drug on two items ($\alpha = 0.91$); “Do you think the side effects of Nuramen would be less serious or more serious than other diabetic nerve pain drugs? (1 = *much less serious*, 7 = *much more serious*), and “Do you think Nuramen would have a smaller number or larger number of side effects compared with other diabetic nerve pain drugs?” (1 = *much smaller number of side effects*, 7 = *much larger number of side effects*).

Ad benefit perceptions

Participants were asked to rate their perceptions of the ad's message about benefits on two items ($\alpha = 0.72$); “What is the ad's message about how much Nuramen would improve your diabetic nerve pain?” (1 = *no improvement*, 6 = *complete improvement*), “In your opinion, what is the ad's message about the overall quality of Nuramen?” (1 = *very poor quality*, 6 = *excellent quality*).

Personal benefit perceptions

Participants rated their own interpretation of the drug's benefits on two items ($\alpha = 0.78$); “In your opinion, how much would Nuramen improve your diabetic nerve pain?” (1 = *no improvement*, 6 = *complete*

improvement), "How would you rate the overall quality of Nuramen?" (1 = *very poor quality*, 6 = *excellent quality*). They were also asked to estimate the likelihood of experiencing a benefit from the drug on a single item; "In your opinion, if 100 people take Nuramen, how many will experience relief from diabetic nerve pain?" (open-ended, number between 0 and 100).

Ad and personal comparative effectiveness perceptions

Participants rated their perceptions of the effectiveness of the drug compared with other diabetic nerve pain drugs on two single item measures, both in terms of the ad's message and their own interpretation. "In your opinion, what is the ad's message about whether Nuramen would be less effective or more effective than other diabetic nerve pain drugs?" (1 = *much less effective*, 7 = *much more effective*), and "Do you think Nuramen would be less effective or more effective than other diabetic nerve pain drugs?" (1 = *much less effective*, 7 = *much more effective*).

2.3.5 | Perceptions of doctor's views

Participants rated their opinion about how their doctor would view the benefits of the drug compared with other diabetic nerve pain drugs on three items ($\alpha = 0.93$); "Do you think doctors trust Nuramen less or more than other diabetic nerve pain drugs?" (1 = *trust Nuramen much less*, 7 = *trust Nuramen much more*), "Do you think doctors prefer Nuramen less or more than other diabetic nerve pain drugs?" (1 = *prefer Nuramen much less*, 7 = *prefer Nuramen much more*), "Do you think doctors would rate Nuramen as less effective or more effective than other diabetic nerve pain drugs?" (1 = *much less effective*, 7 = *much more effective*). Participants also rated their opinion of doctors' beliefs about comparative benefits of the drug on two items ($\alpha = 0.78$); "How much do you think doctors believe Nuramen would improve your diabetic nerve pain?" (1 = *no improvement*, 6 = *complete improvement*), "How do you think doctors would rate the overall quality of Nuramen?" (1 = *very poor quality*, 6 = *excellent quality*), their opinions of doctors' beliefs about the drug's risks on two items ($\alpha = 0.69$); "How serious do you think doctors believe Nuramen's side effect are?" (1 = *not at all serious*, 6 = *extremely serious*), "Do you think doctors believe that Nuramen's side effects would be short-lived or long-lasting?" (1 = *short-lived*, 6 = *long-lasting*), and their opinion of doctors' beliefs about comparative risks ($\alpha = 0.89$); "Do you think doctors believe that the side effects of Nuramen would be less serious or more serious than other diabetic nerve pain drugs?" (1 = *much less serious*, 7 = *much more serious*), "Do you think doctors believe that Nuramen would have a smaller number or larger number of side effects compared with other diabetic nerve pain drugs?" (1 = *much smaller number of side effects*, 7 = *much larger number of side effects*).

2.3.6 | Skepticism

Participants rated their skepticism on the item, "To what degree do you believe the information written in the ad?" (1 = *do not believe at all*, 6 = *completely believe*).

2.3.7 | Attention

Participants were asked "How much attention did you pay to these features of the ad?" (1 = *did not pay attention at all*, 6 = *paid complete attention*). Features of the ad were then listed and included both features that were actually in the ad (e.g., "the product logo" or "the diagram of a foot") as well as features that were not in the ad (e.g., "the picture of a Nuramen tablet", "The phrase, 'Not tested on animals'").

2.3.8 | Importance of drug attributes

Participants rated eight statements, "When you consider taking a drug, how important are the following?" (1 = *not at all important*, 6 = *extremely important*):

- If the drug is new.
- How often the drug is prescribed for the condition.
- How many patients are helped by the drug, according to clinical trials.
- If people I know recommend the drug.
- How many people with my medical condition use the drug.
- How often the drug is used, compared with other drugs in the market that treat the same condition.
- The drug's side effects.
- The drug cost and/or copay.
- My doctor's recommendation.

2.3.9 | General perceptions of market claims

Participants rated their perceptions of the risk and efficacy of "New" and "#1 Prescribed" drugs, "New drugs tend to be *more effective* than drugs that have been in the market for a longer time," "New drugs tend to be *less risky* than drugs that have been in the market for a longer time" (two items, $\alpha = 0.78$), and "The #1 Prescribed drug tends to be *more effective* than other drugs in the market," and "The #1 Prescribed drug tends to be *less risky* than other drugs in the market" (1 = *strongly disagree*, 7 = *strongly agree*; two items, $\alpha = 0.83$).

2.3.10 | Condition status and medical knowledge

Participants rated the severity of their diabetes (1 = *not at all severe*, 6 = *extremely severe*), level of concern about the impact of diabetes on their life (1 = *not at all concerned*, 6 = *extremely concerned*), whether they were currently or had ever taken medication to treat their diabetes (*never taken*, *used to take*, or *currently taking*), how much they knew about the disease (1 = *not at all knowledgeable*, 6 = *extremely knowledgeable*), and how familiar they were with treatments for diabetes (1 = *not at all familiar*, 6 = *extremely familiar*). Participants were also asked if they had ever experienced nerve pain from diabetes (*never experienced*, *used to experience*, or *currently experiencing*), the severity of that pain (0 = *no pain*, 10 = *worst*).

possible pain), and whether they were currently or had ever taken medication to treat their diabetic nerve pain (*never taken, used to take, or currently taking*).

2.3.11 | Literacy and numeracy

We asked participants to answer two subjective health literacy items (Cronbach's $\alpha = 0.36$; Chew et al., 2008) and three objective numeracy items (Cronbach's $\alpha = 0.48$; Schwartz et al., 2009). Given the low internal consistency between the two subjective health literacy items, we used the item "How confident are you filling out medical forms by yourself?" as a single item subjective health measure in our analysis (Jordan, Osborne, & Buchbinder, 2011). Objective numeracy scores ranged from 0 to 3, with higher numbers indicating greater numeracy. Scores of 1 and below on this measure are considered low numeracy (Schwartz et al., 2009).

3 | RESULTS

Analyses were conducted using SPSS 24.0. We conducted Chi-square analyses to examine differences in open-ended responses. We examined recall and recognition of main message elements first in the full sample, then focused our analyses on participants who correctly remembered seeing the appropriate market claim and participants in the control group who correctly did not remember seeing a market claim (focused sample). We did not see significant differences between the demographics of the full and focused sample. Study participants were primarily female (55%), white (92%), non-Hispanic (97%), and were on average age 62. Less than 40% (39% full sample and 37% focused sample) had a high school degree or less and 48% reported household income of \$39,999 or less (see Table 1).

Two-way analyses of variance tests (ANOVAs) were then used to test the impact of efficacy information and market claim on the measures of interest. The two market claim conditions ("#1 Prescribed" and "New") were analyzed in separate 2×3 ANOVAs, which included two levels of market claim (the experimental claim condition and the "None" control condition) and three levels of efficacy information (None, Lower, and Higher).

In addition, we examined covariates (ANCOVA) to see if certain demographic (health literacy, numeracy, age, and disease severity) or attitudinal variables (importance of drug attributes and general perceptions of market claims) had an effect on intention and perceptions.

3.1 | Recall

3.1.1 | Main message recall

Overall, the majority of participants across all conditions freely recalled that the main message of the ad was that the drug *relieves or controls nerve pain* (see Table 2). The other top four categories of recall were *has side effects*, *relieves or controls pain*, *New*, and *relieves or*

TABLE 1 Demographics of the study sample

Demographic variable	Mean (SD) or percent	
	Full sample (n = 525)	Focused sample (n = 360)
Age (range 21–89 years)	62 (11.89) years	62 (12.00) years
Sex		
Male	44.8%	44.4%
Female	55.2%	55.6%
Hispanic or Latino	3.2%	3.3%
Race		
White	91.8%	91.1%
Black or African American	5.1%	5.0%
American Indian/Alaskan Native	1.7%	0.8%
Asian	1.7%	1.4%
Native Hawaiian/Pacific Islander	0.0%	0.0%
Income (Total combined family income during 2016)		
Less than \$20,000	20.0%	20.6%
\$20,000–\$39,999	27.6%	27.2%
\$40,000–\$59,999	17.3%	15.3%
\$60,000–\$79,999	14.1%	14.2%
\$80,000–\$99,999	8.6%	8.9%
\$100,000 or more	12.4%	13.9%
Education (highest level of school completed)		
Less than high school	2.9%	3.3%
High school graduate or GED	36.2%	34.2%
Some college but no degree	20.0%	18.6%
Associate degree in college	11.0%	12.8%
Bachelor's degree	15.4%	15.6%
Advanced or post-graduate degree	14.5%	15.6%

controls foot pain. Of note, only some participants were exposed to the market claim "New," and this analysis includes all participants.

Participants who saw the stimuli with the New claim without efficacy information were more likely to recall a main message of the product *has side effects* (17%) than those who saw the ad with higher or lower efficacy information (5%, 2%; $\chi^2 (2, 177) = 10.42, p = 0.005$). There were no differences between conditions for the #1 Prescribed $\times$ Efficacy analysis ($p > 0.05$).

3.1.2 | Benefit and risk recall

Overall, participants recalled *relieves or controls nerve pain*, *relieves or controls pain*, and *relieves or controls foot pain* most commonly as benefits. Participants recalled *dizziness*, *lightheadedness*, *fainting*, *swelling*, *nausea*, *rash*, *hives*, or *blisters*, and *headaches* most commonly as risks. Of note, *don't know* responses exceeded recall of risks and benefits in some cases. Eighteen percent (18%) of participants responded *don't know/don't care/too many* when asked to recall risks, which is a larger frequency than four of the top five recalled risks, and 12% of participants responded *none/don't know* when asked to recall drug benefits. Recall of product benefits and risks did not differ across conditions, all p 's > 0.05 .

TABLE 2 Free recall of main ad message, benefits, and risks (top five responses)

	Message	Percentage (N)
Main ad message	Relieves/controls nerve pain	75 (395)
	Has side effects	9 (46)
	Relieves/controls pain	8 (44)
	New	8 (42)
	Relieves/controls foot pain	4 (20)
Benefits	Relieves/controls nerve pain	53 (279)
	Relieves/controls pain	24 (126)
	Relieves/controls foot pain	3 (16)
Risks	Dizziness/lightheadedness/fainting	37 (193)
	Swelling (face, mouth, lips, gums, tongue, throat, or neck)	14 (74)
	Nausea	14 (71)
	Headaches	11 (57)
	Rash/hives/blisters	11 (55)

Note. Percentages may add to more than 100% because multiple responses were permitted.

3.2 | Recognition

3.2.1 | Market claim and efficacy

A significantly higher proportion of participants who viewed an ad with a market claim correctly recognized the market claim, whether New or #1 Prescribed, $\chi^2(2, 525) = 20.64$, $p < 0.001$ and $\chi^2(2, 525) = 66.18$, $p < 0.001$, respectively. Of the 177 participants who viewed an ad with a New market claim, 69.5% correctly recognized that claim. Of the 174 participants who viewed an ad with a #1 Prescribed market claim, 47.1% recognized that claim. Likewise, across conditions, a significantly higher proportion of participants who viewed an ad mentioning efficacy level reported seeing the correct efficacy level: No efficacy, $\chi^2(2, 525) = 82.62$, $p < 0.001$; lower efficacy, $\chi^2(2, 525) = 81.06$, $p < .001$; and higher efficacy, $\chi^2(2, 525) = 53.39$, $p < 0.001$. Of the 164 participants who were in the No Efficacy condition, 54.3% selected the correct answer on the efficacy recognition item. Among the 182

participants in the Lower Efficacy condition, 54.9% selected the correct answer. Of the 179 participants in the Higher Efficacy condition, 55.3% selected the correct answer.

3.2.2 | Benefit and risk

Table 3 provides a breakdown of the responses to the recognition of product benefits and risks. Participants showed high recognition of the benefit “Relieves diabetic nerve pain” and moderate recognition of the benefit “Most patients reported that they felt better and could do more.” Less than a third of participants recognized the benefit “Can be taken with or without food.” The number of correct responses were summed to create a benefit accuracy score (0–3). For the total sample, the mean benefit accuracy score was 1.80 out of 3 ($SD = 0.86$). Recognition of benefits did not differ by market claim or efficacy level (all p 's > 0.30).

Recognition was high for two drug risks present in the ad (dizziness and allergic reaction), but only a third of participants recognized the risk of addiction. The number of correct responses were summed to create a risk accuracy score (0–3). For the total sample, the mean risk accuracy score was 1.85 out of 3 ($SD = 0.95$). There was a main effect of efficacy ($F(2, 340) = 3.08$, $p = 0.05$), which was qualified by a significant interaction of #1 Prescribed market claim and efficacy, $F(2, 340) = 3.40$, $p = 0.04$, $\eta_p^2 = 0.02$ (see Figure 2). Participants who did not see a market claim recognized fewer risks when the ad included low efficacy ($M = 1.52$, $SD = 0.96$), compared with no efficacy ($M = 2.13$, $SD = 0.75$).

There was also an effect of New claim, $F(1, 341) = 4.67$, $p = 0.01$, $\eta_p^2 = 0.03$. Participants who saw the New claim correctly recognized more risks ($M = 1.88$, $SD = 0.94$) compared with participants who saw no claim ($M = 1.86$, $SD = 0.94$).

As described above, we conducted the following analyses only on participants who accurately recognized the market claims, so comparisons in this section describe comparisons between participants who accurately remembered the market claim versus participants who accurately did not remember a market claim (control). Supplementary Table 4 presents the means and standard deviations for each of the following measures.

TABLE 3 Percentage of correct and incorrect responses to benefit and risk recognition items

	Item	% Correct (N)
Benefits	Relieves diabetic nerve pain [accurate]	93.3 (460)
	Can be taken with or without food [accurate]	29.7 (156)
	Relieves problems with urination [inaccurate]	90.7 (476)
	Reduces indigestion, nausea, or vomiting [inaccurate]	87.4 (459)
	Most patients reported that they felt better and could do more [accurate]	56.2 (295)
	Safer than other drugs for nerve pain associated with diabetes [inaccurate]	52.6 (276)
Risks	Dizziness [accurate]	76.6 (402)
	Allergic reaction [accurate]	73.9 (388)
	Addiction [accurate]	33.7 (177)
	Blurred vision [inaccurate]	63.4 (333)
	Diarrhea [inaccurate]	55.8 (293)
	Dry mouth [inaccurate]	70.5 (370)

FIGURE 2 Mean risk recognition by market claim and efficacy level [Color figure can be viewed at wileyonlinelibrary.com]

3.3 | Behavioral intention

There were no significant effects on behavioral intention (all p 's > 0.09). This did not change when attitudinal covariates were added to the model. When selected demographic covariates were considered, we found that participants in the #1 Prescribed condition reported higher behavioral intention ($M = 3.51$, $SD = 1.57$) than participants in the control condition ($M = 3.15$, $SD = 1.46$), $F(1, 227) = 4.93$, $p = 0.03$, $\eta_p^2 = 0.02$.

3.4 | Perceptions of product risks

There were no significant effects of perceptions of the ad's message about risks (all p 's > 0.07), personal perceptions of risk (all p 's > 0.50), perceptions of the ad's message about the risk of the product compared with other products that treat the condition (all p 's > 0.08), personal perceptions of comparative risk (all p 's > 0.40), beliefs about doctor's perception of product risk (all p 's > 0.30), or beliefs about doctor's perception of comparative risk (all p 's > 0.30). These results did not change when demographic or attitudinal covariates were considered.

3.5 | Perceptions of product benefits

We found several main effects of market claim on perceptions of drug benefits. With the exception of perceptions of likelihood of experiencing a benefit from the drug, there were no significant differences between efficacy levels, nor were there significant interactions between the market claim and efficacy experimental conditions.

3.5.1 | Ad message about benefits

Participants who saw the #1 Prescribed claim rated the ad's message about the drug benefits as greater ($M = 4.95$, $SD = 0.64$) than those who saw no claim ($M = 4.46$, $SD = 0.99$), $F(1, 231) = 15.10$, $p < 0.001$, $\eta_p^2 = 0.06$.

There were no significant effects for the New claim (all p 's > 0.30). These effects did not change when demographic or attitudinal covariates were added to the model.

3.5.2 | Ad message about comparative effectiveness

Participants who saw the #1 Prescribed claim rated the ad's message about the effectiveness of the drug compared with other products that treat the condition higher ($M = 6.13$, $SD = 0.90$) than those who saw no claim ($M = 5.35$, $SD = 1.37$), $F(1, 231) = 20.93$, $p < 0.001$, $\eta_p^2 = .08$. There were no effects of the New claim (all p 's > 0.30). These effects held when demographic and attitudinal covariates were examined.

3.5.3 | Personal perceptions of benefits

Participants in the #1 Prescribed claim condition rated their personal perceptions of drug benefits as greater ($M = 4.37$, $SD = 0.97$) than those in the control condition ($M = 3.86$, $SD = 1.14$), $F(1, 231) = 10.83$, $p = 0.001$, $\eta_p^2 = 0.05$. Participants in the New claim condition also rated their personal perceptions of drug benefits as greater ($M = 4.13$, $SD = 1.02$) than those in the control condition ($M = 3.86$, $SD = 1.14$), $F(1, 272) = 4.22$, $p = 0.04$, $\eta_p^2 = .02$. These effects did not change when demographic or attitudinal covariates were added.

3.5.4 | Personal perceptions of comparative effectiveness

Participants in the #1 Prescribed claim condition ($M = 5.51$, $SD = 1.10$) and the New condition ($M = 5.15$, $SD = 1.18$), rated the drug as more effective compared to other diabetic nerve pain drugs, as compared with the control condition ($M = 4.90$, $SD = 1.24$), $F(1, 231) = 13.05$, $p < 0.001$, $\eta_p^2 = 0.05$ and $F(1, 268) = 3.88$, $p = 0.05$, $\eta_p^2 = 0.01$, respectively. These effects remained significant when demographic covariates were considered. When attitudinal covariates were examined, the effect of the New claim became nonsignificant ($p = 0.11$).

3.5.5 | Likelihood of benefits

Participants in the #1 Prescribed claim condition rated the likelihood of experiencing a drug benefit as higher when they saw a higher efficacy claim ($M = 66.78$, $SD = 18.95$) than those who saw the lower efficacy claim ($M = 55.78$, $SD = 21.97$) or no claim ($M = 60.33$, $SD = 26.16$), $F(2, 231) = 4.14$, $p = 0.02$, $\eta_p^2 = .04$. These effects did not change when demographic or attitudinal covariates were added to the model.

Participants in the New claim condition or control condition estimated the likelihood of experiencing a drug benefit as higher when they saw a higher efficacy claim ($M = 66.21$, $SD = 19.85$), compared with those who saw lower efficacy ($M = 57.66$, $SD = 21.67$), or no efficacy claim ($M = 61.86$, $SD = 25.06$), $F(2, 272) = 3.35$, $p = 0.04$, $\eta_p^2 = .02$. When demographic covariates were added, additional main effects emerged. Participants in the New claim or control conditions

estimated the likelihood of experiencing a benefit from the drug as higher ($M = 64.63$, $SD = 20.02$) compared with participants who saw no claim ($M = 59.75$, $SD = 23.96$), $F(1, 268) = 4.09$, $p = 0.04$, $\eta_p^2 = 0.02$. Similarly, when attitudinal covariates were considered, participants in the New claim or no claim conditions estimated the likelihood of experiencing a benefit from the drug as higher ($M = 64.63$, $SD = 20.02$) compared with participants who saw no claim ($M = 59.75$, $SD = 23.96$), $F(1, 270) = 3.88$, $p = 0.05$, $\eta_p^2 = 0.01$.

3.6 | Perceptions of doctor beliefs about benefits

Participants in the #1 Prescribed condition rated doctors' perceptions of drug benefit higher ($M = 4.74$, $SD = 0.90$) than those who saw no claim ($M = 4.22$, $SD = 0.99$), $F(1, 231) = 15.10$, $p < 0.001$, $\eta_p^2 = 0.06$, and rated doctors' beliefs about the benefit of the drug compared with other products higher ($M = 5.02$, $SD = 1.06$) than those who saw no claim ($M = 4.43$, $SD = 1.10$), $F(1, 231) = 16.19$, $p < 0.001$, $\eta_p^2 = 0.07$. There were no effects of the New claim (all p 's > 0.20). These effects did not change when demographic or attitudinal covariates were added to the model.

3.7 | Skepticism

Participants in the #1 Prescribed condition were more skeptical of the information in the ad ($M = 4.32$, $SD = 1.08$) compared with participants who saw no claim ($M = 3.82$, $SD = 1.28$), $F(1, 231) = 8.61$, $p < 0.005$, $\eta_p^2 = 0.04$. There were no effects of the New claim (all p 's > 0.20). These effects did not change when demographic or attitudinal covariates were added to the model.

3.8 | Attention to market and efficacy claims

For each respondent, we calculated mean attention paid to the accurate items and normalized the score based on the total number of items shown to the participant, as the total number differed by condition. Participants in the #1 Prescribed condition reported paying more attention to claims ($M = 3.93$, $SD = 1.11$) than those who did not see a claim ($M = 3.54$, $SD = 1.23$), $F(1, 231) = 5.53$, $p = 0.02$, $\eta_p^2 = 0.02$. There were no effects of the New claim (all p 's > 0.06).

4 | DISCUSSION

Our first research question examined the effect that market claims have on perceptions of drug risks and benefits. We observed effects of market claims on participant perceptions of the ad's message and their own perceptions about the drug's benefits, the effectiveness of the drug compared with other similar drugs, and perceptions of doctor beliefs about drug benefits. Regardless of the type of efficacy information in the ad, those who saw an ad with a market claim rated the drug's benefits higher than those who did not see a market claim, particularly if the claim was #1 Prescribed. However, the presence of the #1 Prescribed market claim resulted in greater skepticism about the information in the ad. These findings partially support previous

research which found that ads with market claims implied greater effectiveness (Mitra et al., 2006). We did not observe any effects of market claim on risk perceptions. We also found that the two market claims did not impact perceptions equally. The #1 Prescribed claim had more impact on perceptions of drug benefit than the New claim, suggesting that these two claims communicate different information to consumers.

Based on our second research question, we examined whether perceptions varied by the presence of efficacy information and level of efficacy presented. Participants in the Higher efficacy condition thought that significantly more people would experience diabetic nerve pain relief with Nuramen, as compared with the Lower efficacy condition or no efficacy condition for both of the market claims. Including efficacy information about the drug changes perceptions about benefit likelihood only when the efficacy is higher, compared with lower or no information at all. This suggests that including information about how well the drug works may allow consumers to have a more accurate perception of their likelihood of experiencing a benefit and contribute to making informed decisions about the treatment (O'Donoghue et al., 2014; Schwartz, Woloshin, & Welch, 2009). Although recall of drug benefits and risks did not vary by market claim or efficacy level, we did see some effects for recognition. Participants who saw the New claim correctly recognized more risks compared with participants who saw no claim. Further, when examining the #1 Prescribed claim, participants who did not see a market claim recognized fewer risks when the ad included low efficacy, compared with no efficacy information.

Our third research question explored whether quantitative efficacy information changed the impact of the market claim on perceptions of the drug's risks and benefits. We found limited evidence here. When a claim of #1 Prescribed was present, participants recognized more risks when efficacy information was absent, compared with when low efficacy information was included. The presence of efficacy information did not interact with the presence of the market claim on our other measures.

Our fourth and final research question explored whether certain selected demographic variables (health literacy, numeracy, age, and disease severity) and attitudinal variables (importance of drug attributes and general perceptions of market claims) affected perceptions and intentions. We found some influence of covariates on our results. In the model containing the New market claim, the addition of demographic variables influenced behavioral intentions, and both attitudinal and demographic variables influenced perceptions of benefit likelihood. This suggests that the way people perceive the New market claim may be influenced by personal characteristics and pre-existing attitudes about prescription drugs or market claims themselves.

There are several limitations to this study. First, the sample is not designed to be broadly generalizable to the diabetes population in the USA. For example, the sample has more women, more people who identify as white, and is more highly educated than the US diabetes population. Second, only individuals with diabetes were included in this study, and the study tested advertisements for a hypothetical drug

to treat diabetic nerve pain. Although diagnosis of the medical condition treated by the drug can function as a proxy for involvement, the findings may not generalize to individuals without diabetes or to drugs that treat conditions other than diabetic nerve pain. Third, this study was conducted using an online methodology. Although this is not unusual (the majority of studies of this type are now being conducted online), it is possible that irrespective of study format, participants were distracted and did not devote their full attention to the survey. It is also the case that consumers are encountering this type of information in multiple ways, including online, lending support to the assertion that the results are not due solely to the method of administration. Fourth, we found better recognition accuracy for the New claim than for the #1 Prescribed claim in our manipulation checks. Although we did pretest the stimuli to promote recognition for both the market and efficacy claims, and held the font, color, and location of the claims constant across conditions, it is possible that despite our efforts to make the claims very noticeable, the #1 Prescribed claim was not as salient for participants.

Future research could be conducted with different populations, such as a general population sample, a healthcare professional sample, or with individuals who exhibit low health literacy or low numeracy, to test the generalizability of the findings. In addition, other types of market claims may have different effects on consumer behavioral intentions and perceptions of risk and benefit. Future research could also test the external validity of the present findings by incorporating market claim and efficacy information into existing ads.

4.1 | Conclusion/implications

DTC prescription drug advertising elicits both praise and criticism from consumers and the medical advertising community. Although DTC pharmaceutical advertising can motivate consumers to seek medical information and make informed choices about medical treatments, potential adverse effects exist. Market leadership claims can lead some consumers to overestimate the effectiveness of a brand name pharmaceutical treatment in comparison with a generic or lesser known medication with similar properties (Mitra et al., 2006). Similarly, the results of our study indicate that personal perceptions and perceptions of an ad's message about drug benefits and perceptions about doctors' opinions of a drug may be unduly influenced by market leadership claims. Future research should explore the potential impact on patient–physician relationships because expected outcomes of drug efficacy may increase patient demands for certain pharmaceuticals, in some cases leading to inappropriate prescribing decisions (Young, Lipowski, & Cline, 2005). A final, recurring theme in the literature is that some feel that risk information, in particular, is not adequately explained in DTC pharmaceutical advertisements (Kees, Bone, Kozup, & Ellen, 2008).

Understanding the linkages between DTC prescription drug advertising and consumer perception, and comprehension is useful in guiding public policy for pharmaceutical safety and advertising. In addition to the influence market claims and various types of efficacy

presentations have on consumer perception, as highlighted by our study; factors like imagery and the appearance of the people in ads also influence perceptions of drugs (Cline & Young, 1991). Extrinsic cues, like the esthetic components of advertisements coupled with emotional and social appeals, heavily affect consumers' abilities to rationalize and fully comprehend advertising content (Tsai & Lancaster, 2012). And as this study and others have shown, these extrinsic cues can have a more powerful impact on consumer perceptions than intrinsic cues like dosing, risk, or efficacy information. As consumers become more involved in the healthcare decision-making process, special attention should be given to DTC prescription drug promotion and the many nuances that impact consumer comprehension and perception. This provides both an opportunity and a challenge for regulatory agencies and policy advocates to ensure DTC prescription drug promotion informs and does not mislead patients.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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