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The Effect of Including Quantitative Information on Multiple Endpoints in Direct-to-Consumer Prescription Drug Television Advertisements

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Abstract

Background: Previous research found that adding a single piece of quantitative information about prescription drug benefits to direct-to-consumer (DTC) ads helps consumers understand how well the drug works. However, drug information often includes quantitative information on multiple benefit outcomes and risks. Thus, we examined whether consumer understanding was similarly improved when DTC television ads include varying amounts of quantitative information.

Methods: We randomly assigned participants (945 Internet panelists 60 years old) to view one of nine fictitious prescription drug television ads that varied the presentation of quantitative information for benefits (none, single outcome, two outcomes) and risks (none, one risk category, three risk categories) and then measured gist and verbatim recall/estimation and drug perceptions.

Results: Adding a single benefit outcome and a single risk category replicated past results. Compared with an ad containing no quantitative information, presenting two benefit outcomes and multiple risk categories increased gist and verbatim recall and affected drug perceptions. Compared with presenting a single benefit outcome, presenting two benefit outcomes increased verbatim recall for the second outcome but decreased verbatim recall for the first outcome. Likewise, compared with presenting a single risk category, presenting multiple risk categories increased gist and verbatim recall for the multiple risk categories, but decreased gist recall for a concept more closely associated with the single risk category. Adding multiple risk categories decreased risk perceptions even more than did the single risk category.

Limitations: This study may have limited generalizability because it examined an ad for only one medical condition.

Conclusions: There are tradeoffs to adding multiple quantitative benefit outcomes in DTC ads. However, presenting multiple quantitative risk categories helps consumers better understand a drug's risks.

Keywords

prescription drug; advertising; television; DTCA; quantitative

Introduction

One widespread source of medical information is direct-to-consumer (DTC) television advertising of prescription drugs. The pharmaceutical industry spent 2.375 billion dollars on television DTC advertising in 2010 (1), with an average monthly household exposure of 112 DTC television ads that same year (2). US Food and Drug Administration (FDA) regulations require that DTC ads present a fair balance of the drug's benefits and risks, and television ads must disclose the major risks in the audio or audio and visual parts of the ad (3). This advertising can influence patients and ultimately affect health outcomes, such as diagnosis and treatment (4–7). Consequently, it is important that consumers receive accurate and understandable information from DTC ads that can inform their discussions with healthcare providers. One way to improve consumers' understanding of medical information is to include quantitative, or numerical, information about a treatment's potential benefits and risks (including drug warnings, precautions, and adverse events) (8, 9). There is a wide literature on how to present quantitative information to facilitate understanding (e.g., 10–14). Although content analyses have shown that few DTC television ads contain quantitative information about drug benefits and risks (15–17), providing quantitative information in DTC advertising has been recommended (18), and previous studies have shown it can help consumers better understand benefit and risk information in print ads (19–22) and television ads (19).

One limitation of the previous research on presenting quantitative information in DTC ads is that it tested the inclusion of only simple quantitative information (e.g., presenting one clinical trial endpoint or outcome) whereas actual drug information can be more complicated and nuanced. For instance, drug information can include multiple complicated outcomes and the probabilities of experiencing different risks. FDA has stated that it is “particularly concerned about presentations of information based on complex clinical trial data that may be confusing to consumers” (23). To begin to address this issue and build on previous research, we examined the effects of presenting multiple pieces of quantitative information for both benefits and risks in a DTC television ad. To do so, we conducted a 3×3 experimental study that varied the presentation of quantitative drug benefit information (none vs. single benefit outcome vs. multiple benefit outcomes) and quantitative drug risk information (none vs. one risk category vs. multiple risk categories). In addition, our study focused on older adults, as they are the audience for many DTC television ads and they take proportionally more prescription drugs and watch more television than do younger adults (24, 25).

Another limitation of previous research is that it focused on verbatim memory and therefore may not have captured all meaningful memory processes. Research on fuzzy trace theory has demonstrated evidence for two distinct types of memory: *verbatim* memory, which records the details of an event or activity and fades within a few days, and *gist* memory,

which involves an interpretation of the event or activity and is much longer lasting (26). Reyna (27) has shown that when making medical decisions, gist memory appears to predict well-informed decision making.

Consistent with previous studies (19–22), we hypothesized that adding a single piece of quantitative information (about either benefits or risks) leads to more accurate verbatim recall of that information among consumers. Without quantitative information, people may base their gist understanding of a drug's benefits and risks on personal experiences, biases, or assumptions. For instance, people may believe that prescription drugs in general are highly effective (28) or that greater benefits are associated with lower risks (29). Therefore, we also hypothesized that adding a single piece of quantitative information leads to more accurate gist recall of that information.

Although we predicted that some quantitative information would be more helpful than none, we also anticipated that too much quantitative information might overload consumers. Studies have shown that consumers can use print materials, such as clinical trial summaries, that often present multiple pieces of quantitative information to consumers (30, 31). This suggests that additional quantitative information may result in the same outcomes as a single piece of quantitative information. However, researchers have questioned whether including more numbers and details leads to cognitive overload (32). Television ads, which present information at a set pace using multiple elements simultaneously (audio, text, images), may make consumers particularly susceptible to cognitive overload (33). Therefore, we had two competing hypotheses—that adding multiple pieces of quantitative information might improve gist and verbatim recall for each piece of information relative to other conditions (no information and a single piece of quantitative information), or that it might decrease recall because of an overload of information.

In the absence of quantitative risk information, individuals tend to overestimate drug risks, even when they are described as “rare” (8, 9). Previous research has found that presenting quantitative risk information can lower drug risk perceptions (8); therefore, we predicted that risk perceptions would be lower in the conditions with quantitative risk information. Studies of DTC advertising also have shown that benefit perceptions can be affected by quantitative information (e.g., 13). Given that the quantitative information in the study indicated that the drug was not very effective, we expected that benefit perceptions would be lower in the conditions with quantitative benefit information. Based on previous research, we did not expect any of the presentations of quantitative information to influence participants' retention of the non-quantitative information in the ad (e.g., drug's indication, list of side effects; 19). Finally, because numeracy is an important individual difference to consider when presenting quantitative information (34), we conducted exploratory moderation analyses to test whether the quantitative presentations differentially affected those with high or low numeracy.

Methods

Participants

Based on prior studies of DTC advertising effects (e.g., 15) we assumed a small effect size ($f = .10$ to $.15$) and attempted to recruit 100 participants per condition to achieve statistical power of 0.90 ($\alpha = .05$ for main effects and $.017$ for multiple comparisons). We recruited participants from ResearchNow's online consumer panel of U.S. adults, which, through a combination of open enrollment and invitation-only methods, has become a demographically-balanced general consumer panel with nearly 2,000,000 panelists. A total of 13,695 panelists were invited to participate in the study, of whom 1,358 responded and 945 were ultimately eligible and randomly assigned to one of the nine experimental conditions. All participants were U.S. adults 60 years of age or older (Table 1).

Design

In this 3×3 experimental study, we randomly assigned participants to view one ad that varied the presentation of quantitative information for benefits (none, single outcome, two outcomes) and risks (none, single risk category, multiple risk categories) as shown in Figure 1. The single benefit outcome referred to the percentage of participants on the drug and on placebo whose vision improved to 20/60. The second benefit provided the average number of letters on an eye chart each group could see. We used pretesting to ensure that participants were familiar with the outcomes conveyed in the claims (e.g., 20/60 vision). The single risk category stated that all the side effects occurred in 10% or less of people who take the drug. The multiple risk categories grouped the side effects into those occurring in 6–10%, 1–5%, or less than 1% of people who take the drug.

Procedure

Participants were randomly assigned to view one of nine television ads for Vistasin, a fictitious prescription drug indicated to treat cataracts (see supplementary file for the ad storyboard). The ads ranged from 71 seconds (no quantitative benefit or risk information condition) to 96 seconds (multiple outcomes, multiple risk categories condition) in duration. To increase the likelihood that participants would be motivated to pay attention to an ad for cataracts, which disproportionally affect older adults (35), we recruited participants 60 years of age or older. Participants watched the ad twice and then completed a questionnaire containing the outcome measures of interest. The questionnaire was refined through cognitive interviews and pretesting. Participants were not able to proceed to the questionnaire without viewing the ad and could not view the ad again after beginning the questionnaire. The study was approved by FDA's Research Involving Human Subjects Committee and RTI International's Institutional Review Board.

Materials and Measures

Gist recall/estimation.—To measure whether participants understood the gist of the information in the ad (36, 37), we asked three benefit gist questions and four risk gist questions. For benefit gist, we asked participants one true-false question and two closed-ended questions: reporting vision improvement by choosing from three options ("vision will

not improve at all,” “vision will improve but won’t be back to normal,” and “vision will improve to normal”) and reporting the percentage of people who took Vistasin by choosing from four options ranging from “less than half (0–40%) to “All (100%)” (or selecting “don’t know”). For risk gist, we asked two true-false questions and two closed-ended questions with five response options, ranging from “less than 1%” to “16–20%.”

Following previous studies that measured recall against a control condition (38–42), the information needed to answer these questions was present in the multiple outcomes or multiple risk categories conditions, making these questions a recall task for participants in these conditions. However, the information was not always present in the other conditions, making some questions a guessing or estimation task for participants in those conditions (see Tables 2 and 3).

Verbatim recall/estimation.—To measure whether participants could accurately report the quantitative benefit information, we asked three questions. First, we asked participants to report Vistasin’s average improvement in vision by choosing from nine options ranging from 20/20 to 2/100 (or selecting “don’t know”). Second, we asked participants to report the percentage of people who took Vistasin and improved their vision to 20/60 in an open-ended question. Third, we asked participants to report the number of letters people who took Vistasin could see in an open-ended question.

To measure whether participants could accurately report the quantitative risk information, we asked participants to choose how often six side effects occurred in people who take Vistasin. Response options were: less than 1%, 1–5%, 6–10%, 11–15%, 16–20%. We summed the number of correct responses to capture verbatim recall/estimation of the multiple risk categories (0–6). We also summed the number of responses that fell into one of the three categories under 10% (correct = 1%, 1–5%, 6–10%) to capture verbatim recall/estimation of the single risk category (0–6).

As with the gist questions, the information needed to answer these questions was present in the multiple outcomes or multiple risk categories conditions, making these questions a recall task for participants in these conditions. However, the information was not always present in the other conditions, making some questions a guessing or estimation task for participants in those conditions (see Tables 2 and 3).

Retention of non-quantitative information.—To measure non-quantitative benefit and risk recall, we asked participants “What are the benefits of Vistasin?” and “What are the side effects of Vistasin?” in open-ended formats. Independent raters coded responses (Cohen’s kappa = .84 for benefit recall, .81 for risk recall). Benefit recall reflects whether participants recalled general benefit information (e.g., “Vistasin improves vision”). For risk recall, we summed the number of correct risks listed (e.g., double vision, detached retina; range = 0–11).

To measure benefit and risk recognition, we asked participants to select whether a series of statements were mentioned in the ad. Participants responded to three true statements and three false statements about Vistasin’s benefits, such as “Vistasin improves vision in people

with cataracts.” Participants also responded to four true statements and four false statements about Vistasin’s risks, such as “A side effect of Vistasin is a detached retina.” We summed the number of correct responses to the true statements (0–3 for benefit recognition, 0–4 for risk recognition).

Perceptions.—For efficacy perceptions, participants reported their agreement with the statement, “Vistasin is more likely to improve vision than other treatments for cataracts” (1 = strongly disagree, 6 = strongly agree). For risk perceptions, participants reported their agreement with the statement, “Vistasin is riskier than other treatments for cataracts” (1 = strongly disagree, 6 = strongly agree). We also asked participants, in separate questions, to report how serious and how bothersome Vistasin’s side effects would be (1 = not at all serious/bothersome, 6 = extremely serious/bothersome). These three items formed a risk perception scale ($\alpha = .85$). As a measure of risk/benefit tradeoff, we also asked participants to respond to the statement, “Thinking overall about the risks and benefits, would you say Vistasin has...” (1 = more risks than benefits, 4 = equal risks and benefits, 7 = more benefits than risks).

Additional measures.—We measured participant characteristics, including age, sex, race, ethnicity, education, and cataract history. We measured numeracy with a subjective numeracy scale ($\alpha = .84$) and measured objective numeracy by summing the number of correct responses to three fill-in-the-blank math questions (34, 43, 44). Although not discussed here, for exploratory purposes we also asked participants about their skepticism toward the ad, how persuasive they found the ad, and their behavioral intentions.

Statistical Analysis

We conducted all analyses using SPSS Version 23. We used logistic regression models to assess whether the benefit presentation and risk presentation affected categorical outcome measures. We used Analyses of Variance (ANOVAs) to test whether benefit presentation and risk presentation affected continuous outcome measures. For each outcome, we ran two separate models: (1) a main effects model with just benefit presentation and risk presentation and (2) a model with the main effects as well as the interaction between the two factors. Because the interaction terms were not significant, we present the models with the main effects only. Significance was defined as $p < .05$. For contrasts comparing among benefit or among risk presentation conditions, significance was defined with a Bonferroni adjusted $p < .017$.

Separately, we also tested whether the objective numeracy was associated with the dependent variables and whether objective numeracy moderated any significant effects by repeating the relevant analyses with objective numeracy and an interaction term between objective numeracy and the benefit or risk presentation variable. We did the same for subjective numeracy. To interpret significant interactions, we created median-split variables for both numeracy measures.

Role of the Funding Source

The study had no external funding source; it was funded by the U.S. Food and Drug Administration.

Results

The effect of adding a single benefit outcome or single risk category

Compared with no-quantitative-benefit condition participants, single-benefit-outcome condition participants were more likely to give accurate responses for two of three gist measures and for the two verbatim measures related to the single benefit outcome (Table 2). We did not find significant differences in perceived efficacy or retention of non-quantitative information.

Compared with no-quantitative-risk condition participants, single-risk-category condition participants were more likely to give accurate responses for the two gist measures related to the single risk category (Table 3). Participants in the single risk category condition also had lower perceived risk than did participants in the no quantitative risk condition. However, they did not have significantly higher verbatim risk recall. We did not find significant differences in retention of non-quantitative information.

The effect of adding multiple benefit outcomes or multiple risk categories

Comparisons with no quantitative information.—Compared with no-quantitative-benefit condition participants, multiple-benefit-outcomes condition participants were more likely to give accurate responses for two of three gist measures and for all three verbatim measures (Table 2). Participants in the multiple benefit outcomes condition also had higher perceived efficacy than did participants in the no quantitative benefit condition. We did not find significant differences in retention of non-quantitative information.

Compared with no-quantitative-risk condition participants, multiple-risk-categories condition participants were more likely to give accurate responses for three of the four gist measures and for both verbatim measures (Table 3). They also had lower perceived risk and thought the tradeoff tilted more towards benefits than did participants in the no quantitative risk condition. We did not find significant differences in retention of non-quantitative information.

Comparisons with a single benefit outcome or a single risk category.—When the question was a recall task for participants in the single benefit outcome and multiple benefit outcomes conditions, single-benefit-outcomes condition participants' recall was more likely to be accurate (one gist measure and two verbatim measures) or there was no significant difference (two gist measures; Table 2). When the question was an estimation task for participants in the single benefit outcome condition but a recall task for participants in the multiple benefit outcomes condition, multiple-benefit-outcomes condition participants' recall was more likely to be accurate (one verbatim measure). We did not find significant differences in perceived efficacy or retention of non-quantitative information.

When the question was a recall task for participants in the single risk category and multiple risk category conditions, single-risk-category condition participants' recall was more likely to be accurate (one gist measure) or there was no significant difference (one gist measure and one verbatim measure; Table 2). When the question was an estimation task for participants in the single risk category condition but a recall task for participants in the multiple risk categories condition, multiple-risk-categories condition participants' recall was more likely to be accurate (two gist measures) or there was no significant difference (one verbatim measure). Participants in the multiple risk categories condition also had lower perceived risk and thought the tradeoff tilted more towards benefits than did participants in the single risk category condition. Although we did not expect the risk presentation to affect retention of non-quantitative risk information, one comparison was significant: participants in the single risk category condition had lower non-quantitative risk recall than those in the multiple risk categories condition.

The effect of adding benefit and risk information

We did not expect that adding quantitative benefit information would affect risk measures or vice versa, and the results largely supported this hypothesis. However, we found one significant effect: participants in the no quantitative risk condition were more likely to give the accurate response to the benefit gist recall/estimation question regarding the percentage of people who will have better vision (54.1% [CI = 48.2–59.9]) than were participants in the single risk category (43.8% [CI = 38.1–49.6]; $p = .017$, OR = 1.50) and multiple risk category conditions (44.0% [CI = 38.8–49.4]; $p = .01$, OR = 1.53).

Numeracy.—Objective and subjective numeracy were positively correlated with each other ($r = .47$, $p < .001$), with a mean of 1.51 (95% CI = 1.45–1.57) and a median of 2.0 for objective numeracy and a mean of 4.18 (95% CI = 4.12–4.25) and a median of 4.25 for subjective numeracy. On the objective numeracy scale, 15.1% of participants had zero correct answers, 33.0% had one correct answer, 37.5% had two correct answers, and 14.4% had three correct answers.

Objective numeracy moderated one effect of the benefit presentation (verbatim benefit recall/estimation: 20/60) and one effect of the risk presentation (risk gist recall/estimation: “Almost everyone who takes Vistasin...”), $\chi^2(2) = 10.66$, $p = .005$ and $\chi^2(2) = 6.64$, $p = .04$, respectively. For the verbatim benefit recall/estimation measure, the comparison between the single outcome condition and the multiple outcomes condition was not significant for high objective numeracy participants, $p = .31$, OR = 0.78. For the risk gist recall/estimation measure, the comparisons with the no quantitative risk information condition (single risk category vs. no quantitative risk conditions, and multiple risk categories vs. no quantitative risk conditions) were not significant for low objective numeracy participants, $p = .34$, OR = .79, and $p = .74$, OR = .92, respectively.

Subjective numeracy moderated two effects of the risk presentation (risk recognition and perceived risk) but none of the effects of the benefit presentation, $F(2, 936) = 3.72$, $p = .02$, $f = .09$, and $F(2, 936) = 3.58$, $p = .03$, $f = .09$, respectively. For risk recognition, there was an additional significant effect for participants with low subjective numeracy: they had

significantly lower risk recognition in the multiple risk categories condition compared with the no quantitative risk condition, $F(1, 482) = 7.77, p = .01, f = .13$. For perceived risk, the comparisons with the single risk category condition (single risk category vs. multiple risk categories conditions and single risk category vs. no quantitative risk conditions) were not significant for low subjective numeracy participants, $p = .05, f = .09$, and $p = .71, f = .02$, respectively.

Discussion

This study examined the inclusion of single and multiple pieces of quantitative information regarding benefits and risks in television DTC ads. For a single piece of quantitative information, we tested a single benefit outcome and listed all risks as occurring in 10% or less of people. For benefits, we found that adding a single outcome, compared with no quantitative information, increased gist and verbatim recall but did not affect perceptions. For risks, we found that adding a single risk category, compared with no quantitative information, increased gist recall and decreased risk perceptions as expected. Based on prior studies, we did not expect the addition of a single piece of quantitative information to influence participants' retention of the non-quantitative information in the ad. This held true for benefits, but adding a single risk category did decrease participants' recall of the drug's risks. Overall, our results replicated past studies and confirm that a single piece of quantitative benefit and risk information can be added to television DTC ads to help consumers understand the drug's benefits and risks.

Prescription drug information often includes more information than the single pieces of quantitative information tested in previous studies. Therefore, we tested the presentation of multiple pieces of information: adding a second benefit outcome measure and providing three risk categories to describe the prevalence of risks (6–10%, 1–5%, and less than 1%). Like the presentation of a single piece of quantitative information, presenting multiple pieces of quantitative information about benefits and risks increased gist and verbatim recall compared with no quantitative information. Including more risk categories, in comparison with no quantitative information decreased risk perceptions. This finding lends support to the idea that quantitative risk information can help calibrate people's understanding of risk likelihood, which is often inflated (9). However, including more quantitative benefit information unexpectedly increased efficacy perceptions. The increase in efficacy perceptions suggests that participants may have used a heuristic to form their efficacy perceptions, believing that more data on the drug suggests better efficacy. It is also possible that they found the second benefit outcome, the number of letters on an eye chart, to be more persuasive. Additional research is warranted on how quantitative information affects drug efficacy perceptions.

More information may be helpful, but there may also be a point at which additional information overloads individuals. Thus, we also examined the comparison between presenting a single piece of quantitative information and multiple pieces of quantitative information. We found that adding another benefit outcome increased verbatim recall for the second outcome but decreased verbatim recall for the first outcome. Similarly, adding multiple risk categories increased gist and verbatim recall for information conveyed by the

multiple risk categories (for instance, that some side effects are more likely than others), but decreased gist recall for concepts more closely associated with the single risk category (for instance, the prevalence of the most common side effects). In addition, presenting multiple risk categories decreased risk perceptions even more than presenting a single risk category did. We did not find any evidence that two benefit outcomes and multiple risk categories were overwhelming; however, how much information is too much remains an issue for future examination.

Previous research found that people could understand quantitative risk and benefit information that was presented together in print ads (20–22). This study extended that research to television ads. Television ads differ from print ads in that they present information in audio and visual channels and are not self-paced. By manipulating the quantitative information provided for both benefits and risks, we were also able to test the interplay of these types of information. Adding quantitative benefit information did not affect participants' understanding of the risk information. For the most part, adding quantitative risk information did not affect participants' understanding of the benefit information. In addition, we did not find a detrimental effect when we added quantitative information about both benefits and risks at the same time.

Numeracy was significantly related to several measures, indicating that high numeracy individuals can understand more of the quantitative benefit and risk information conveyed in DTC television ads than low numeracy individuals can. Numeracy moderated only a few outcomes, and the pattern was not consistent. However, there was some suggestion that the quantitative information was less useful for low numeracy participants than it was for high numeracy participants.

This study may have limited generalizability because it examined only one medical condition. Further, participants were at risk for the medical condition, but they did not necessarily have experience with it. Another limitation of the sample is that internet panelists may have higher numeracy and literacy than the general population. At the same time, our participants were older, which could mean they had more cognitive decline than the general population. Future studies should be conducted with other medical conditions and with a broader array of patients who may be more motivated and engaged. This study may also have limited generalizability because it examined only one ad, including one execution of “complex” information. For example, because this is the first study to test this kind of benefit presentation, it is unclear whether the effects on efficacy perceptions were driven by the particular benefit information used in the study or whether consumers will view drugs with more quantitative benefit claims as more effective in general. Other ad executions and other types of complexity, such as results from multiple clinical trials, may result in different findings. Future research should explore other types of complex information to determine what information is most useful for consumers.

Consumers who view DTC television ads can process quantitative information about a drug's benefits and risks and can use it to inform their perceptions of the drug. Taken together, these results suggest that there are tradeoffs when considering adding additional benefit outcome measures, but that presenting multiple risk categories can help consumers

have a better understanding of the drug's safety profile. Including quantitative information about a drug's benefits and risks in a DTC television ad can improve the information consumers have when they discuss treatment options with their healthcare providers.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Benefit presentation	
None	In clinical studies, Vistasin improved vision in people with cataracts.
Single Outcome	In clinical studies, 52% of people with cataracts improved their vision to 20/60 while taking Vistasin, compared to 23% without Vistasin. [starting at an average baseline of 20/100]
Multiple Outcomes	In clinical studies, 52% of people with cataracts improved their vision to 20/60 while taking Vistasin, compared to 23% without Vistasin. [starting at an average baseline of 20/100]. With Vistasin, people with cataracts could see an average of 77 letters on a 100-letter eye chart compared to 65 letters without Vistasin.
Risk presentation	
None	Side effects of Vistasin include watery eyes, runny nose, loss of eyelashes, pain or stinging during application, fever, light flashes at the outer edges of vision, loss of depth perception, sensitivity to light, double vision, and detached retina.
Single risk category	Side effects that occur in 10% or less of people who take Vistasin include watery eyes, runny nose, loss of eyelashes, pain or stinging during application, fever, light flashes at the outer edges of vision, loss of depth perception, sensitivity to light, double vision, and detached retina.
Multiple risk categories	Side effects that occur in 6-10% of people who take Vistasin include watery eyes, runny nose, loss of eyelashes, and pain or stinging during application. Side effects that occur in 1-5% of people who take Vistasin include fever, light flashes at the outer edges of vision, and loss of depth perception. Side effects that occur in less than 1% of people who take Vistasin include sensitivity to light, double vision, and detached retina.

Figure 1.
Study manipulations.

Table 1.

Participant Characteristics

	<i>n</i>	%
Total	945	100%
Age		
60–64 years	343	36.3
65–74 years	330	34.9
75–92 years	272	28.8
Sex		
Male	473	50.1
Female	472	49.9
Race		
White	784	83.0
Black	135	14.3
Other	32	3.39
Ethnicity		
Hispanic/Latino	13	1.4
Not Hispanic/Latino	932	98.6
Education		
High school or less	469	49.6
Some college	170	18.0
Bachelor's degree or higher	306	23.4
Cataract history		
Never had cataracts	505	53.4
Previously had cataracts	241	25.5
Currently have cataracts	173	18.3
Don't know	26	2.8

Table 2.

Percentages and means (95% confidence intervals [CI]) for benefit measures, by benefit presentation.

	No quantitative benefit	Single outcome	Multiple outcomes
N	317	305	323
Gist recall/estimation: benefits	% (CI)	% (CI)	% (CI)
Agree: "Vision will improve but won't be back to normal"	82.3 (78.1–86.5)	89.8 (86.4–93.2)	93.5 (90.8–96.2)
<i>p</i> -value (OR): vs. no benefit (estimation)		.01 (1.89)	<.001 (3.04)
<i>p</i> -value (OR): vs. single outcome (recall)			.11 (1.61)
True: "More than half of people with cataracts who take Vistasin will have at least some vision improvement"	89.6 (86.2–93.0)	91.5 (88.3–94.6)	89.2 (85.8–92.6)
<i>p</i> -value (OR): vs. no benefit (estimation)		.45 (1.23)	0.85 (0.95)
<i>p</i> -value (OR): vs. single outcome (recall)			0.34 (0.77)
About half (41–60%): "What percentage of people with cataracts who take Vistasin will have better vision?"	35.0 (29.8–40.3)	58.0 (52.5–63.6)	48.6 (43.2–54.1)
<i>p</i> -value (OR): vs. no benefit (estimation)		<.001 (2.58)	<.001 (1.72)
<i>p</i> -value (OR): vs. single outcome (recall)			.01 (0.67)
Verbatim recall/estimation: benefits			
20/60: "On average, people with cataracts who took Vistasin improved their vision to"	3.2 (1.2–5.1)	70.8 (65.7–75.9)	61.9 (56.6–67.2)
<i>p</i> -value (OR): vs. no benefit (estimation)		<.001(76.32)	<.001(49.93)
<i>p</i> -value (OR): vs. single outcome (recall)			.01 (0.65)
52%: "What percentage of people with cataracts who took Vistasin improved their vision to 20/60?"	0.0 (0.0–0.0)	13.8 (9.9–17.6)	7.4 (4.6–10.3)
<i>p</i> -value (OR): vs. no benefit (estimation)		N/A	N/A
<i>p</i> -value (OR): vs. single outcome (recall)			.01 (0.50)
77: "People with cataracts who took Vistasin could see an average of how many letters on a 100-letter eye chart?"	0.0 (0.0–0.0)	0.0 (0.0–0.0)	53.9 (48.4–59.3)
<i>p</i> -value (OR): vs. no benefit (estimation)		N/A	N/A
<i>p</i> -value (OR): vs. single outcome (estimation)			N/A
Retention of non-quantitative information: benefit recall	89.9 (86.6–93.2)	91.1 (88.0–94.3)	86.7 (83.0–90.4)
<i>p</i> -value (OR): vs. no benefit		.62 (0.87)	.24 (1.34)
<i>p</i> -value (OR): vs. single outcome			.10 (1.54)
	M (CI)	M (CI)	M (CI)
Retention of non-quantitative information: benefit recognition (0–3)	2.57 (2.49–2.64)	2.59 (2.52–2.67)	2.54 (2.47–2.62)
<i>p</i> -value (f): vs. no benefit		.65 (.01)	.68 (.01)
<i>p</i> -value (f): vs. single outcome			.39 (.03)
Perceptions: perceived efficacy (1 = strongly disagree, 6 = strongly agree)	3.37 (3.24–3.50)	3.51 (3.38–3.64)	3.64(3.52–3.76)
<i>p</i> -value (f): vs. no benefit		.12 (.05)	.002 (.10)
<i>p</i> -value (f): vs. single outcome			.15 (.04)

Note. OR = odds ratio. f = Cohen's f.

Table 3.

Percentages and means (confidence intervals [CI]) for risk measures, by risk presentation.

	No quantitative risk presentation	Single risk category	Multiple risk categories
N	294	299	352
Gist recall/estimation: risk	% (CI)	% (CI)	% (CI)
False: "Almost everyone who takes Vistasin will experience at least one side effect."	65.0 (59.5–70.4)	76.9 (72.1–81.7)	75.0 (70.5–79.5)
<i>p-value (OR): vs. no quantitative risk (estimation)</i>		.002 (1.78)	.01 (1.60)
<i>p-value (OR): vs. single risk category (recall)</i>			0.55 (0.90)
True: "Some of Vistasin's side effects are more likely to occur than others."	73.8 (68.8–78.8)	68.9 (63.6–74.1)	88.4 (85.0–91.7)
<i>p-value (OR): vs. no quantitative risk (estimation)</i>		.17 (0.78)	<.001 (2.67)
<i>p-value (OR): vs. single risk category (estimation)</i>			<.001 (3.42)
6–10%: "Vistasin's <u>most common</u> side effects occur in what percent of people who take it?"	31.6 (26.3–36.9)	57.9 (52.3–63.5)	33.8(28.9–38.7)
<i>p-value (OR): vs. no quantitative risk (estimation)</i>		<.001 (2.97)	.52 (1.12)
<i>p-value (OR): vs. single risk category (recall)</i>			.001 (0.38)
Less than 1%: "Vistasin's <u>least common</u> side effects occur in what percent of people who take it?"	34.0 (28.6–39.4)	26.4 (21.4–31.4)	46.0 (40.8–51.2)
<i>p-value (OR): vs. no quantitative risk (estimation)</i>		.04 (0.70)	.002 (1.65)
<i>p-value (OR): vs. single risk category (estimation)</i>			<.001 (2.38)
Verbatim recall/estimation: risk	M (CI)	M (CI)	M (CI)
Under 10% (0–6)	5.11 (4.95–5.27)	5.32 (5.17–5.48)	5.56 (5.46–5.66)
<i>p-value (f): vs. no quantitative risk (estimation)</i>		.04 (.06)	<.001 (.15)
<i>p-value (f): vs. single risk category (recall)</i>			.02 (.08)
All percentage categories (0–6)	2.08 (1.95–2.21)	2.24 (2.10–2.38)	2.43 (2.29–2.58)
<i>p-value (f): vs. no quantitative risk (estimation)</i>		.12 (.05)	<.001 (.11)
<i>p-value (f): vs. single risk category (estimation)</i>			.05 (.06)
Retention of non-quantitative information: risk recall (0–7)	2.21 (2.04–2.38)	1.94 (1.78–2.10)	2.32 (2.16–2.49)
<i>p-value (f): vs. no quantitative risk</i>		.03 (.07)	.40 (.03)
<i>p-value (f): vs. single risk category</i>			.001 (.10)
Retention of non-quantitative information: risk recognition (0–4)	3.06 (2.94–3.17)	2.86 (2.73–2.98)	2.87 (2.76–2.98)
<i>p-value (f): vs. no quantitative risk</i>		.03 (.16)	.02 (.07)
<i>p-value (f): vs. single risk category</i>			.95 (.01)
Perceptions			
Perceived risk (1 = lower risk, 6 = higher risk)	4.03 (3.90–4.16)	3.81(3.67–3.94)	3.47 (3.36–3.58)
<i>p-value (f): vs. no quantitative risk</i>		.01 (.08)	<.001 (.20)
<i>p-value (f): vs. single risk category</i>			<.001 (.12)
Risk-benefit tradeoff (1 = more risks than benefits, 7 = more benefits than risks)	3.63 (3.46–3.80)	3.90 (3.74–4.07)	4.25 (4.11–4.39)
<i>p-value (f): vs. no quantitative risk</i>		.02 (.08)	<.001 (.18)

	No quantitative risk presentation	Single risk category	Multiple risk categories
N	294	299	352
<i>p-value (f): vs. single risk category</i>			.003 (.10)

Note. OR = odds ratio. f = Cohen's f.

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