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## Narratives that Address Affective Forecasting Errors Reduce Perceived Barriers to Colorectal Cancer Screening

Amanda Dillard, Angela Fagerlin, Sonya Dal Cin, Brian J Zikmund-Fisher, and Peter A Ubel  
University of Michigan Ann Arbor, MI UNITED STATES

### Abstract

Narratives from similar others may be an effective way to increase important health behaviors. In this study, we used a narrative intervention to promote colorectal cancer screening. Researchers have suggested that people may overestimate barriers to colorectal cancer screening. We recruited participants from the US, ages 49–60 who had never previously been screened for colorectal cancer, to read an educational message about screening for the disease. One-half of participants were randomly assigned to also receive a narrative within the message (control participants did not receive a narrative). The narrative intervention was developed according to predictions of affective forecasting theory. Compared to participants who received only the educational message, participants who received the message along with a narrative reported that the barriers to screening would have less of an impact on a future screening experience. The narrative also increased risk perception for colorectal cancer and interest in screening in the next year.

### Keywords

colon cancer screening; barriers; narratives; affective forecasting; tailoring; risk perception; USA; intervention

### Main text

Although colorectal cancer is the second leading cause of cancer death in the United States (Jemal, Siegel, Ward, Murray, Xu, & Thun, 2007), only 50% of eligible adults are screened for the disease (Shapiro, Seeff, Thompson, Nadel, Klabunde, & Vernon, 2008). Some individuals may fail to be screened due to physician inaction (Coughlin & Thompson, 2005; Seeff, Nadel, Klabunde, Thompson, Shapiro, Vernon, et al., 2004). But many times, it is patients' perceived barriers that stand in the way of optimal screening (Denberg, Melhado, Coombes, Beaty, Berman, Byers, et al., 2005; Janz, Lakhani, Vijan, Hawley, Chung, & Katz, 2007; Lewis & Jensen, 1996; Walsh & Terdiman, 2003; Wardle, Sutton, Sutton, Williamson, Taylor, McCaffery, Cuzick, et al., 2000). Examples of these barriers include the cost of testing, the inconvenience of having a test, and the uncertainty about how to

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Corresponding Author dillaram@gvsu.edu.

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complete a particular test (Myers, Vernon, Tilley, Lu, & Watts, 1998; Wardle et al., 2000). Studies also suggest that individuals are particularly concerned about psychological aspects of screening—for example, the possible embarrassment of having a test performed or the perceived pain associated with screening (Denberg et al., 2005; Janz et al., 2007; Lewis & Jensen, 1996; Walsh & Terdiman, 2003).

Individuals who fail to be screened may overestimate the impact of these barriers on the screening experience (Janz et al., 2007). They may believe, for example, that they will experience greater embarrassment or pain during screening than they truly will. This idea is consistent with affective forecasting theory (Wilson & Gilbert, 2003, 2005). According to this theory, people's "affective forecasts" – their predictions about how they will feel during specific, future or imagined events – tend to be fairly accurate in terms of valence; that is, people can accurately predict whether a future situation will feel pleasant or unpleasant to them. However, people typically mispredict the intensity and duration of these feelings (Buehler & McFarland, 2001; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998), errors collectively termed the impact bias (Wilson & Gilbert, 2005). Though the impact bias can occur for either positive or negative events, typically it takes the form of overestimating the intensity and duration of negative feelings in response to anticipated negative events (Gilbert et al., 1998).

If people have an impact bias when considering barriers to colorectal cancer screening, that is, they overestimate the impact of barriers on the screening experience, then reducing these perceptions may increase screening intentions. Although some have argued that direct, favorable experiences with screening may reduce perceived barriers, the suggestion is impractical because it is perceived barriers that impede screening in the first place (Janz et al., 2007; e.g., Walsh & Terdiman, 2003, Wardle et al., 2000). In the absence of direct experience, however, perceptions of barriers could be reduced by providing individuals with an indirect, vicarious experience, namely learning about a similar other who discovers that he or she had overestimated the impact of the barriers on the experience.

### **Narratives in health behavior and decision-making**

Narratives are accounts of individuals' experiences conveyed in either the first or third person (Winterbottom, Bekker, Conner, & Mooney, 2008). Narratives have been shown to increase risk perception for health threats as well as to motivate health behaviors. Rothman, Kelly, Weinstein, and, O'Leary, (1999), for example, had sexually active college students watch a film in which young adults who were HIV-positive talked about the disease, including how and when they contracted it. The film increased students' perceptions of vulnerability to HIV as well as their intentions to be tested and their likelihood of completing a test one month later. The effects of narratives were less straightforward in a colorectal cancer screening intervention by Lipkus, Green, and Marcus (2003). In that study, researchers had older adults read narratives from colorectal cancer patients who described activities they believed accounted for their diagnosis. Although the narratives failed to increase risk perception of colorectal cancer, they increased perceptions of severity of the disease, which were positively associated with completing a screening test six months later.

The role of narratives in people's health behavior decisions is important for at least two reasons. First, narratives are often included in health-related decision-making programs (including those on cancer screening), but their effects have not been investigated independently of other "tools" (e.g., preference exercises) in the programs (e.g., Morgan, Deber, Llewellyn-Thomas, Gladstone, Cusimano, O'Rourke, et al., 2000; Stalmeier, Unic, & Verhoef, Van Daal, 1999; Volk, Cass, & Spann, 1999). Second, little is known generally about how narratives influence behavior or decisions (Winterbottom et al., 2008). In the present study, we explored one explanation that is closely tied to our narrative.

### Overview and hypotheses of current study

In the current study, older adults who had never been screened for colorectal cancer read an educational message about screening for the disease. Within the message, we varied two factors. First, participants either received or did not receive a first-person narrative from a similar other (i.e., an individual who matched participants in gender, age, and race), who described a personal experience with the colon cancer screening decision. Second, participants either read about a colonoscopy (i.e., familiar type of test) or a virtual colonoscopy (i.e., less familiar type of test) procedure in the message. After the message, participants reported their perceptions of the impact of the barriers on screening, their risk perception of colorectal cancer, knowledge, and interest in screening.

We varied whether participants read about colonoscopy or virtual colonoscopy to control for test familiarity. Colonoscopy, due to its prevalence as a screening method, may be a test for which people have already received real life narratives, i.e., stories from family or friends about the experience. Such "pre-existing" narratives could influence the effects of the narrative in the current study. For this reason, we decided to include the test, virtual colonoscopy, because it was similar to colonoscopy (the preparation is identical), but less familiar to people and less likely to be associated with "pre-existing" narratives. We were only interested in whether this test type factor interacted with the narrative factor.

Our first hypothesis related to the specific type of narrative we presented. Relying on principles and predictions made by affective forecasting theory, we developed a narrative to reduce the perceived impact bias of barriers on the colorectal cancer screening experience (see Method section for narrative design and development). We hypothesized that participants who received the educational message with this narrative would rate the barriers as having less of an impact on a future screening experience than participants who received the message without the narrative.

Our second hypothesis was that participants who received the educational message with a narrative would have higher risk perceptions. Although past studies have found that narratives about health behaviors may reduce risk perception (Dillard, McCaul, Kelso, & Klein, 2006), increase risk perception (Rothman et al., 1999), or have a null effect on risk perception (Lipkus et al., 2003), these differences likely stem from the different types of narratives presented in these studies. In our narrative, the individual was someone who was making the same decision, and who was similar to participants in demographic characteristics (i.e., same gender, age, and race as participant). More importantly, the individual in the narrative reiterated a theme in the message – that cancer may not have

symptoms. Receiving this information twice, including once from an anecdotal perspective, could increase the salience of personal risk.

The third hypothesis was that compared to participants receiving the message without the narrative, those receiving the message with a narrative would score higher on knowledge following the message. This hypothesis was based on the idea that narrative information, by virtue of being interesting to people, should lead to greater engagement and attention to a message (Green & Brock, 2000; Petty & Cacioppo, 1986).

Finally, because our narrative was designed to reduce the perceived impact of barriers, and because barriers have been associated with screening behavior in past research (e.g., Denberg et al., 2005; Janz et al., 2007), our fourth hypothesis was that those who received the message with a narrative would report greater interest in screening than those who received the message only. The hypothesis would also be supported by previous research showing that exposure to pro-health narratives from similar others promote positive health behavior changes (Lipkus et al., 2003; Rothman et al., 1999).

## Method

### Procedure

Participants were recruited from Survey Sampling International (SSI), a survey research company that maintains a demographically diverse pool of over 1 million individuals in the United States recruited via opt-in methods such as Internet banner advertisements and online digit dialing. All survey members complete a demographic screening questionnaire, which enables use of a stratified random sampling process that ensures demographic diversity with regards to gender, age, and race/ethnicity. (For more information, see [www.surveysampling.com](http://www.surveysampling.com).) Ethical approval was obtained from the University of Michigan Medical IRB.

From April 29 to May 16, 2008, individuals between the ages of 49–60 were invited to participate via email by the survey company. We chose this age range because current screening guidelines are that adults age 50 and older have regular screening tests (Levin, Lieberman, McFarland, Smith, Brooks, Andrews, et al., 2008). The range allows for individuals who are beginning to contemplate screening (e.g., 49) as well as those who may take several years before contemplating screening (e.g., 60). The email invitations included a link to the survey website. When individuals came to the website, they answered an eligibility question, “Have you ever had any of the following screening tests for colorectal cancer?” We listed the five possible colorectal cancer screening tests (stool test for blood/FOBT, flexible sigmoidoscopy, barium enema, colonoscopy, virtual colonoscopy/CT colography). Because prior screening could influence how participants responded to both the educational message and the narrative intervention, only those who reported “No” were allowed to continue in the study.

Participants who continued in the study reported their demographic characteristics along with their baseline risk perception for developing colorectal cancer. During this initial set of questions, participants also responded to a question about what their most important barrier

to screening was. We asked them, “If you had to have a screening test for colorectal cancer, which of these issues would you be *MOST* concerned about?” Response options were, “Having a screening test would... a) be uncomfortable or painful, b) make me feel embarrassed, c) make me worry about whether I had cancer, d) be inconvenient, and e) gross me out.” Each of these responses was further defined with a brief explanation. For example, “make me feel embarrassed” was followed by the phrase, “having a nurse and doctor explore back there.” In addition to providing descriptive data on the relative importance of specific barriers, this information was also used to tailor the narrative for participants assigned to the narrative group.

Before they were presented with the educational message, participants were randomized to the 2 (Narrative: present vs. absent) x 2 (Screening test type: colonoscopy vs. virtual colonoscopy) experimental design. One-half of participants read the message with a narrative integrated in it, and one-half read the message without this narrative. One-half read about colonoscopy in the message and one-half read about virtual colonoscopy. While participants viewed the message, we recorded time spent on each page. After the message, participants completed measures of the perceived impact of barriers, risk perception, knowledge, and screening interest. Following the measures, participants were debriefed. In exchange for participating in the study, all participants were entered into a drawing for modest cash prizes. To offset anticipated lower response rates among ethnic minority subsamples, all African-American, Asian-American, and Hispanic-American participants received an additional \$3 incentive upon completion of the survey.

## Materials

**Colorectal cancer screening message**—The majority of the information in the educational message was adapted from the online booklet, “What You Need to Know about Cancer of the Colon and Rectum” by the National Cancer Institute ([www.cancer.gov](http://www.cancer.gov)). We obtained permission from the National Cancer Institute to use a direct replica of a drawing in the booklet depicting the digestive system. Examples of topic headings included in our message were, “Learning about your colon,” “What is colon cancer?” “Protecting yourself: Screening”, “Who should get screened?” and “What is a Colonoscopy/Virtual colonoscopy?”

**First-person narrative**—If participants were randomly assigned to the narrative group, a narrative was integrated into the cancer screening message. Participants in the control group read the message without the narrative. The narrative described one individual’s experience with the screening decision while reiterating information presented in the message. There were four segments of the narrative that appeared in different places in the message. For example, in the beginning of the message, all participants learned that the goal of the study was to educate them about colorectal cancer and screening for the disease. Additionally, participants who had been assigned to receive a narrative read the first segment of the narrative in which the character discussed feeling uncertain about screening and having little knowledge about the screening tests (see Figure 1 for the complete narrative). A photograph (from the Center for Health Communication Research Photo Database; <http://>

[chcr.umich.edu/photobrowser/](http://chcr.umich.edu/photobrowser/)) accompanied the narrative. The photograph was matched to the gender, age, and race characteristics of the participant, as reported at baseline.

In the next two segments of the narrative, the character discussed various barriers to screening. Each of the barriers has been shown to be important in colon cancer screening decisions (Lewis & Jensen, 1996; Myers et al., 1998; Walsh & Terdiman, 2003; Wardle et al., 2000). In one segment, the character described his or her most important barrier. This barrier was tailored to participants' baseline reports. For example, if a participant reported during baseline that his or her most important barrier to screening would be embarrassment during a test, the character in the narrative said that embarrassment was most important to him or her. The purpose of this tailoring was to bolster the participant's perceived similarity to the narrative character. In the next segment, the character reported some concern about all of the barriers. We included these other barriers because although participants were able to express their most important barrier at baseline, they may have still been somewhat concerned about the other barriers as well.

The final segment of the narrative focused on the impact bias. To develop this segment, we relied on predictions of affective forecasting theory about the causes of an impact bias (Wilson & Gilbert, 2005). Wilson and Gilbert have argued that an impact bias stems from two sources: focalism, in which an individual underestimates how much other events will influence thoughts and feelings at the time of a future or anticipated event (e.g., Gilbert et al., 1998; Ubel, Loewenstein, & Jepson, 2003; Ubel, Loewenstein, Schwarz, & Smith, 2005), and adaptation or immune neglect, in which an individual underestimates his or her ability to make sense of an experience, particularly a negative one (Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000). We therefore attempted to reduce the impact bias by having the character in the narrative contradict both of these issues. For example, to address focalism, the character described other events that occurred during the screening experience, "I got to catch up on my reading" and "My daughter gave me a ride to the appointment." To address adaptation neglect, the character described adapting to the screening result, "Whatever happens—I'll deal with it just like I deal with everything else."

It is important to note that compared to the educational message, the narrative included no additional factual information. In fact, the narrative was developed to "echo" the information in the message with the individual continuously thinking (and reiterating) information presented in the message. For example, in one part of the message, participants read, "Some people think that if they don't have any symptoms, there is no reason to get screened for colon cancer. But colon cancer does not always cause symptoms, particularly if the disease is in an early stage. The idea behind screening is to get tested for colon cancer even though you don't have symptoms or you don't think you have the disease. Screening can find potential problems early, before they cause cancer or symptoms." Immediately following this information, participants in the control group proceeded to the next section of the message while participants in the narrative group read segment 2 of the narrative in which the individual stated, "When thinking about screening, I couldn't help but think about how I had been feeling fine for awhile. Why would I have a test if I wasn't having any problems?" The individual continues to say that it would be awful to find he/she could have found cancer early.



## Outcomes

**Perceived impact of barriers**—We asked five questions about the impact of barriers on screening. The questions were, “How painful do you think it would be to have a tube inserted into your colon?”, “How embarrassed would you feel while in the examination room when the nurses and doctor perform the test?”, “How much of an inconvenience would having a screening test be for you—including both the preparation and the test the following day?”, “How worried would you be about having to prepare for the screening test (for example, having to do the all-liquid diet, spending time in the bathroom)?”, and “How much do you think the preparation for the screening test (for example, having to do the all-liquid diet, spending time in the bathroom) would affect your daily routine?” Responses were on 7-point scales ranging from “Not at all” to “Extremely.” We averaged the items to form a composite impact bias measure. The reliability coefficient (alpha) was .80.

**Risk perception**—Compared to other types of risk perception measures (e.g., absolute or numerical-based), assessing “feelings of vulnerability” have been shown to be superior in predicting future behaviors (Weinstein, Kwitel, McCaul, Magnan, Gerrard, & Gibbons, 2007). Thus we used a previously validated measure of feelings of risk to assess risk perception (Weinstein et al., 2007). We asked participants (at baseline and following the message) to indicate their agreement with the statement, “If I don’t get screened, I would feel very vulnerable to colon cancer in the next year.” Responses were on 7-point scales ranging from “Strongly disagree” to “Strongly agree.”

**Knowledge**—To assess participants’ knowledge of information presented in the message, we asked nine questions. The questions included both multiple choice and true/false items. For example, one multiple choice question asked, “About how many hours before the screening test do individuals need to begin the clear liquid diet?” For the true/false items, participants indicated whether statements such as “The exam lasts 30 minutes,” were true or false. Responses to each question were scored as correct or incorrect (non-responses were scored as incorrect), and correct responses were summed.

**Screening interest**—Prior to asking participants about their interest in screening, we asked them to imagine there would be no financial costs for them associated with screening. Interest in screening was assessed with three items: “How interested are you in looking for more information about Colonoscopy (for example, by using the Internet or talking to others)?”, “How interested are you in talking to your doctor about Colonoscopy?”, and “Given what you know right now, how interested are you in getting a Colonoscopy?” (If participants were randomly assigned to read about virtual colonoscopy, the questions were about that type of test). Responses were on 7-point scales ranging from “Not at all interested” to “Extremely interested.” The items were averaged, and the reliability coefficient (alpha) was .95.

## Results

### Participants

Five-thousand one hundred and twenty-six individuals reached the initial page of the online survey; of these, 3024 (59%) did not meet eligibility criteria, and 358 (7%) dropped out prior to beginning outcome measures. Those who dropped out of the study did not differ from those who completed outcome measures with respect to age or gender. However, completers were significantly more likely to report their race as African-American,  $p = .03$ . Of the remaining 1744 individuals who participated in the study, only the 1533 (88%) who spent at least 30 seconds on the message were included in final analyses.<sup>1</sup>

Of the 1533 individuals included in the final analyses, fifty three percent of the participants were female and the average age of participants was 54 years ( $SD = 3.4$ ). The majority were White (83%; 7% of whom were Hispanic ethnicity) with some African American (12%) and Asian American (3%) participants (2% other races or not reported). There were no significant differences in gender, age, or race characteristics between experimental groups.

### Preliminary Analyses

Table 1 presents descriptive data for barrier ratings at baseline. For the majority of participants, the greatest barrier was that screening could be uncomfortable or painful. For others, worry about completing the test was most important, with fewer participants selecting embarrassment, inconvenience, and disgust as their most important barrier. As for familiarity of tests, participants were most familiar with colonoscopy—85% of them had heard of this test before. Fecal occult blood test was second most familiar (61%), followed by barium enema (44%), virtual colonoscopy (23%), and flexible sigmoidoscopy (22%).

On average, participants spent 3 minutes and 33 seconds ( $M = 212.68$ ,  $SD = 187.84$ ) on the educational message. Those who read the message with the narrative spent approximately 26 seconds longer ( $M = 25.59$ ,  $SD = 47.63$ ).

Table 2 presents the correlations among the measures. As can be seen in the Table, both baseline risk perception and risk perception following the message were associated with interest in screening. The correlations show that as risk perception increases, interest in screening increases. Perceived impact of the barriers was negatively associated with intentions, suggesting that as participants perceived the barriers to have less of an impact on screening, they were more likely to report interest in screening. Knowledge after the message was associated with time spent on the message with higher knowledge scores for participants who spent longer on the message. Knowledge was also associated with interest in screening such that those with greater knowledge had more interest. Finally, time spent on the message was significantly correlated with knowledge and intentions.

### Primary analyses

We used 2 x 2 analyses of variance (ANOVAs) to analyze results. The only exception was for risk perception, in which we used analyses of covariance (ANCOVAs), and controlled for baseline risk perception estimates. For all analyses, there were no interactions between



narrative and screening test type. Recall that we were only interested in type of test if it interacted with the narrative factor. Because analyses revealed no narrative x type of test interactions, we report only the analyses and results for narratives, while controlling for the type of test factor.

Table 3 presents the means and standard deviations for the outcome measures. As can be seen from the Table, participants in the control group perceived the barriers as having a greater impact on screening than participants in the narrative group, and the difference was significant,  $F(1,1503) = 35.76, p < .001$ , Cohen's  $d = .30$ . In other words, the narrative reduced the perception of the barriers' impact on a future screening experience. The Table also shows that being in the narrative group was associated with greater risk perception for cancer, and an ANCOVA revealed that this difference was significant,  $F(1,1498) = 4.22, p = .04, d = .11$ . Thus, individuals who saw the message with a narrative increased their risk perception for cancer relative to those who read only the message without a narrative. Despite a trend suggesting lower knowledge scores for those who received a narrative (several  $F$ s  $> 1$  for individual knowledge items), the overall knowledge difference was not significant,  $F(1,1452) = 1.83, p = .18$ . Finally, compared to participants in the control group, participants in the narrative group reported greater interest in screening in the future, and this difference was significant,  $F(1,1533) = 4.52, p = .03, d = .11$ .

## Discussion

Perceived barriers to colorectal cancer screening are an important predictor of whether an individual decides to have a screening test (Lewis & Jensen, 1996; Walsh & Terdiman, 2003; Wardle et al., 2000). Janz et al. (2007) have suggested that individuals who complete screening may find barriers to be less burdensome than they anticipate. We tested a narrative intervention in which a demographically similar person discussed feelings related to barriers of screening. Specifically, the similar other expressed concern about the various barriers, and then later discovered that these concerns had been overestimated. Compared to a control group who received an educational message about screening without the narrative, participants who received the message with the narrative reported that the barriers would have less of an impact on a future screening experience. Those who saw the narrative also reported they felt at greater risk of colon cancer and they were more interested in screening in the next year.

The content of the narrative intervention in this study was based on affective forecasting theory (Wilson & Gilbert, 2005). According to this theory, people often show an impact bias—they tend to mispredict the intensity and duration of their feelings in future or imagined situations. The impact bias may be particularly relevant for health behavior decisions about negative events (Damschroder, Zikmund-Fisher, & Ubel, 2005; Gilbert et al., 1998; Ubel, Loewenstein, & Jepson, 2005). Colorectal cancer screening is often anticipated to be a negative experience (Denberg et al., 2005; Lewis & Jensen, 1996; Walsh & Terdiman, 2003). Together with research suggesting the barriers to screening may be overestimated (Janz et al., 2007), the findings suggest a possible impact bias in this screening decision. Our study suggests that a narrative can be used to influence these impact bias estimates.

In general, little is known about why narratives influence decisions or behavior (Khangura, Bennett, Stacey, & O'Connor, 2008; Winterbottom et al., 2008). In a review by Winterbottom, the two most commonly investigated mechanisms of narrative effects were vividness of information and credibility of the message. Others have suggested that information processing may be an important mechanism. For example, Kreuter and colleagues (2007) argued narratives may encourage attention and comprehension of information in a message. In our study, we predicted that reducing participants' impact bias regarding the effects of barriers on the screening experience would increase interest in screening. Because our study used a cross-sectional design, we could not test mediation. However, the results were consistent with a mediational process: receiving a narrative was associated with perceiving the barriers as less impactful on the screening experience, and perceiving the barriers as less impactful was associated with greater interest in screening in the next year.

Narrative interventions may be particularly effective in cancer communication (Kreuter et al., 2007). Thinking about decisions related to cancer may elicit thoughts of illness and death (Peters, Lipkus, & Defienbach, 2006), and simply the word cancer' provokes anxiety in healthy adults (Donovan, Jalleh, & Jones, 2003). Because individuals who feel anxious may be more likely to respond defensively, cancer messages may be particularly vulnerable to resistance. Narratives, because they are a subtle manipulation, may increase the salience of a cancer message, without inciting the corresponding anxiety (Green, 2006). In this way, narratives may breach individuals' "defense radar," and offset resistance to cancer messages (Dal Cin, Zanna, & Fong, 2004).

The narratives in the current study increased cancer risk perception, a finding consistent with past research (Rothman et al., 1999). Although other studies have found null or opposite effects of narratives on risk perception (e.g., Dillard et al., 2006; Lipkus et al., 2003), it is difficult to compare these studies with the present study because the narratives were different. We believe that in our study, being in the narrative group increased risk perception of colorectal cancer because the character in the narrative may have increased the salience of risk of the disease (Green, 2006). Here was someone who was similar to participants and making the same decision. Moreover, he or she was reiterating themes in the message such as cancer does not always have symptoms. These characteristics of the narrative may have made personal risk of the disease more salient (and less abstract) for participants, increasing their risk perception relative to controls.

The findings that narratives increased risk perception and screening interest have implications for informed decision-making interventions. In these interventions, narratives are often used to help patients decide between medical treatment options (Khangura et al., 2008). The goal of these interventions is to inform the patient and encourage a decision consistent with patient preferences (Frosch & Kaplan, 1999; O'Connor, Rostom, Fiset, Tetroe, Entwistle, Llewellyn-Thomas, et al., 1999). However, because the independent effects of these narratives are rarely tested (e.g., Morgan et al., 2000), it is unclear how they alone influence informed decision-making. The present study would suggest that narratives may bias risk perception and treatment choice in an informed decision-making context. The

findings support the suggestion by Winterbottom and others (2008) that caution should be exercised when using narratives in informed decision-making interventions.

We observed a null effect of narrative on knowledge. Previous research and theorizing suggested that narratives could lead to more knowledge because of more attention or engagement (Petty & Cacioppo, 1986). However, the message in the present study was personally relevant to all participants (i.e., all participants were of the screening age). Researchers have argued that personal relevance may be the most important variable in recipient attention to a message (Brinol & Petty, 2006). Because it was personally relevant, all participants may have attended equally to the message regardless of whether a narrative was included.

Across studies, narratives can and do vary considerably on multiple dimensions (from physical characteristics like length to concept characteristics like topic covered; Winterbottom et al., 2008). This variability makes it difficult to organize and interpret the effects of narratives across studies. Winterbottom and others (2008) suggested that more systematic exploration of narratives is needed. One way to systematically explore narratives is to use experimental designs and to integrate theory when developing a narrative. In the present study, we used an experimental design and integrated social psychological theory in developing our narrative. Future studies that additionally include longitudinal designs to test mechanism will further our understanding of narratives' effects.

### Limitations

Our study had several limitations. First, our narrative intervention reduced the perceived impact of barriers on the screening experience. Although participants in the narrative group had less of a perceived impact bias, this was not a true impact bias as we did not test whether participants had actually overestimated these barriers. To do that, we would have needed a prospective study in which we followed participants over time, assessing perceived barriers before screening and ratings of barriers during or immediately after screening. Similarly, although the narrative addressed focalism and adaptation neglect (to reduce the perceived impact bias), we could not assess these constructs because of the cross-sectional nature of the study. Third, it is not clear whether the effects observed in this study were due to the narrative information (i.e., one individual's experience with the colorectal cancer screening) or the narrative format. Although we did not present additional factual information in the narrative, a future study should present a message verbatim in a narrative and non-narrative format. Fourth, the data in this study were collected via an internet survey and thus may not have been representative of all Americans of the colon cancer screening age. However, previous studies using a similar survey panel have replicated results from nationally representative samples (e.g., Lacey, Smith, & Ubel, 2006). Finally, we recognize that the effects of narratives on outcomes were small. However, given the small marginal cost of including narratives in health promotion interventions, these small effect sizes are clinically meaningful.

## Conclusion

The present study used a narrative intervention that reduced perceptions of the impact of barriers on colorectal cancer screening. The narrative increased perceived risk for colorectal cancer as well as interest in screening. More studies that systematically explore the effects of narratives including those that use experimental paradigms and develop narratives according to theoretical predictions are needed. In addition, longitudinal studies are needed to test mechanisms through which narratives may have effects. These research initiatives will provide insight into the best use of narratives as a health behavior change strategy.

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**Table 1**

## Most important concern if had to have screening test

Having a test would be uncomfortable or painful (for example, having a procedure done in that sensitive area)	47%
Having a test would make me feel embarrassed (for example, having a nurse and doctor explore back there)	21%
Having a test would make me worry about whether I had cancer (for example, wondering what results would say)	16%
Having a test would be inconvenient (for example, having to miss work to go to the appointment)	14%
Having a test would gross me out (for example, having to deal with things back there)	2%

*Note.* Percentage refers to proportion of participants selecting barrier as most important.

Table 2

## Correlations among measures

Variable	2	3	4	5	6
1. Baseline risk perception	.47**	.02	-.01	.09**	.24**
2. Risk perception		-.06*	.02	.08**	.43**
3. Perceived impact barriers			.02	-.01	-.19**
4. Knowledge				.29**	.12**
5. Time spent on message					.15**
6. Interest in screening					

Note.

\*  $p < .05$ .

\*\*  $p < .01$ .

**Table 3**

Means and standard deviations for primary outcomes

<b>Variable</b>	<b>Control</b>	<b>Narrative</b>
Perceived impact of barriers	4.59 (1.38)	4.15 (1.36)
Risk perception	2.79 (1.38)	2.95 (1.36)
Knowledge	.67 (.22)	.66 (.21)
Interest in screening	4.07 (1.94)	4.27 (1.90)

*Note.* Knowledge means refer to overall proportion of items correct.