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Self-Affirmation Moderates Effects of Unrealistic Optimism and Pessimism on Reactions to Tailored Risk Feedback

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Abstract

We examined whether self-affirmation would facilitate intentions to engage in colorectal cancer (CRC) screening among individuals who were off-schedule for CRC screening and who were categorized as unrealistically optimistic, realistic, or unrealistically pessimistic about their CRC risk. All participants received tailored risk feedback; in addition, one group received threatening social comparison information regarding their risk factors, a second received this information after a self-affirmation exercise, and a third was a no-treatment control. When participants were unrealistically optimistic about their CRC risk (determined by comparing their perceived comparative risk to calculations from a risk algorithm), they expressed greater interest in screening if they were self-affirmed (relative to controls). Non-affirmed unrealistic optimists expressed *lower* interest relative to controls, suggesting that they were responding defensively. Realistic participants and unrealistically pessimistic participants who were self-affirmed expressed relatively *less* interest in CRC screening, suggesting that self-affirmation can be helpful or hurtful depending on the accuracy of one's risk perceptions.

Keywords

Self-affirmation; risk perception; unrealistic optimism; unrealistic pessimism; social comparison; cancer screening

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People tend to exhibit unrealistic optimism about their chances of experiencing a wide variety of health conditions (Harris, Griffin, & Murray, 2008; Helweg-Larsen & Shepperd, 2001; Weinstein, 1980, 1987). We define unrealistic optimism here as the *mistaken* belief that one's own chances of experiencing a health problem are relatively lower than the chances of other people. For example, sexually active individuals think they are less at risk for HIV than others (van der Velde, van der Pligt, & Hooykaas, 1994). Some research shows that unrealistically optimistic individuals have more risk factors and are less cognizant of those risk factors (Davidson & Prkachin, 1997; Dillard, McCaul, & Klein, 2006; Radcliffe & Klein, 2002; Wiebe & Black, 1997; for review, see Klein & Cooper, 2008), suggesting this bias could be consequential.

Weinstein's (1980) first demonstration of unrealistic optimism was based on group-level analyses which showed that a disproportionate number of sample members rated their risk as below average. However, this procedure makes it impossible to identify which sample members are biased, a necessity in order to determine whether those biases are consequential. Studies that measure unrealistic optimism at the level of the individual (e.g., Dillard et al., 2006; Wiebe & Black, 1997) can more easily examine the individual correlates and consequences of this bias. A given person can be identified as unrealistically optimistic if that person's perceived comparative risk is lower than that of a more objective criterion, such as comparative risk calculated from a risk algorithm.

One could also be unrealistically optimistic about an event in a more absolute sense – e.g., believing that an event will not happen when objective factors would suggest otherwise. However, we focus here on the comparative definition of unrealistic optimism in part because people often think about risk in comparative terms (Klein, 2003). Unrealistic optimism can be distinguished from *comparative* optimism, or the belief that one's risk is lower than that of other people irrespective of the accuracy of that belief. Because of the use of an objective criterion, the current study addresses *unrealistic* optimism – the mistaken belief that one's risk is lower than that of other people – and how it might be related to behavioral intentions.

Individuals cling tenaciously to their optimistic beliefs by using a plethora of defensive strategies (e.g., Croyle, Sun, & Louie, 1993; Klein, 1996); as a result, unrealistic optimism is particularly resistant to change using risk communications (e.g., Weinstein & Klein, 1995). Such resistance is not surprising given that risk communications often bring one's behavior into question, engaging mechanisms that reduce their impact. Recent work suggests that if people are given the opportunity to reflect on core attributes or values in the context of threatening health feedback, they are less likely to respond defensively (Sherman & Cohen, 2006). This research is based on self-affirmation theory (Steele, 1988), which holds that people are more accepting of threatening information when they can sustain a general feeling of morality, integrity, and consistency. In one study, when drinkers read an article linking alcohol use to breast cancer and were self-affirmed in advance (by writing an essay about a core value), they were more receptive to the article and considered themselves more at risk (Harris & Napper, 2005). We reasoned that self-affirmation might be particularly effective at reducing defensive responses to threatening health messages among people who are unrealistically optimistic about a health risk.

Of course, people are not always unrealistically optimistic about future events. At times, they may be unrealistically pessimistic, such as when estimating how well they might cope with negative life events (Blanton, Axsom, McClive, & Price, 2001). We know much less about unrealistic pessimism than about unrealistic optimism. How might self-affirmation influence individuals who tend to be unrealistically pessimistic? On the one hand, self-affirmation could have a detrimental effect by reducing concern and therefore interest in

health-promotion behaviors. Indeed, self-affirmation has been shown to reduce rumination and stress (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; Wiesenfeld, Brockner, Petzall, Wolf, & Bailey, 2001), suggesting it could have similar effects on unrealistically pessimistic individuals. Conversely, self-affirmation might make pessimistic individuals feel more efficacious and less fatalistic, thereby eliciting *more* rather than less health promotion behavior. The literature on unrealistic pessimism is too scant to make a strong prediction either way. However, if self-affirmation has a detrimental effect, the indiscriminate use of it as an intervention tool – particularly in applied contexts with patients and other individuals who may tend to be more pessimistic – would be unjustified.

A related question is how self-affirmation influences people who view their risk more accurately. For such individuals, risk feedback is likely to be consistent with *a priori* views of their risk, making the feedback less threatening. This should be particularly true for individuals who are not at high risk. Recent work suggests that self-affirmation can reduce interest in health-promotion behavior among individuals who are not personally threatened by a persuasive health message. For example, van Koningsbruggen and Das (2009) showed that whereas high-risk members of a sample had higher intentions when self-affirmed than when not affirmed, intentions were lower among self-affirmed low-risk individuals. That may make sense in some contexts – low risk individuals often do not need to engage in risk-reduction behavior. In the current context, however, where we examined individuals who were off-schedule for colorectal cancer (CRC) screening (recommended for all men and women over age 50 regardless of other risk factors), the effect of self-affirmation could be detrimental and thus deserves examination.

Summary and Overview

We explored the effects of self-affirmation on screening intentions (and subsequent screening behavior at a six-month follow-up) among a sample of healthy older adults who were not engaging in recommended CRC screening. Using a risk calculator and participants' own comparative risk estimates for CRC, we categorized participants as unrealistically optimistic, realistic, or unrealistically pessimistic about their CRC risk, and then gave them tailored risk feedback that we would expect to increase their intentions to get screened. We then measured participants' intentions to get a CRC screening test. Our main hypothesis was that self-affirmation would cause unrealistic optimists to express greater intentions to screen than non-affirmed unrealistic optimists (as well as the control group) in response to the feedback. We also examined whether unrealistic optimists who were not self-affirmed would respond defensively, i.e., express relatively *lower* interest in screening than controls. Finally, the design allowed us to explore whether realists and unrealistic pessimists expressed different intentions to screen when self-affirmed, and to determine whether there were differences in subsequent screening behavior. The study was not powered to detect behavioral differences but provided an initial look at the durability of self-affirmation effects in this context.

There are several unique attributes of this experiment including the fact that it identifies biased risk perceptions at the level of the individual and examines effects of self-affirmation in an older community sample. It is the first study to investigate how the link between unrealistic optimism and intentions is moderated by self-affirmation. Moreover, the study employs a prospective design with the measurement of a discrete (rather than habitual) behavior. For habitual behaviors, it is difficult to establish the temporal relationship between risk perceptions and behavior (Brewer, Cuite, Herrington, & Weinstein, 2004) because behavior may alter perceptions of risk. Interpretation is facilitated when one measures a novel behavior in a sample largely unfamiliar with the behavior. For example, Brewer et al. (2004) examined the relationship between risk perceptions and vaccination for Lyme

Disease. In this study, we measured intentions to engage in CRC screening among individuals having little or no experience with screening. We also measured screening behavior 6 months later.

Method

Participants

Using random-digit dialing, we contacted 1861 households in the Pittsburgh metropolitan area. A total of 538 individuals met eligibility criteria of which 251 expressed initial interest in study participation. Of this group, 141 completed both the baseline assessment and laboratory protocol. All were healthy adults between the ages of 50 and 75 inclusive ($M = 57.80$, $SD = 6.49$) – the recommended age range for CRC screening (U.S. Preventive Health Services Task Force, 1996). The sample was 66% female; 37% had no college experience and 31% had at least a college degree (the remaining 32% reported some college coursework but no degree). Eighty percent of the sample was White and 16% Black. All participants were off-schedule for CRC screening (no fecal occult blood test in last year, no colonoscopy in last 10 years, and no sigmoidoscopy in last 5 years). These three screening tests were carefully explained by the interviewer before assessing whether participants had completed them.

Participants were not eligible to participate if they had ever had CRC. All participants possessed two or more risk factors for CRC (excluding being age 50 and over, which was a common risk factor for all participants). Risk factors were assessed during the recruitment interview and included any first degree relative with CRC; never been checked for polyps; or if checked, had a polyp detected; cigarette smoker; two or more alcoholic beverages per day; three or fewer days a week of moderate-to-high intensity exercise for 30 minutes at a time; four or more servings of red meat per week; and four or fewer servings of fruits and vegetables per day. We explicitly recruited only individuals with two or more risk factors in order to be able to provide threatening social comparison information to the sample about their risk factor standing. Including age 50 and over as a risk factor, participants had a mean of 4.60 risk factors ($SD = 0.71$) with no between-group differences ($F < 0.8$, ns).

All study procedures were approved by the University of Pittsburgh IRB and were carried out in accordance with ethical principles of the American Psychological Association.

Procedure

Baseline Interview: Participants who met eligibility criteria and agreed to participate were scheduled for a phone interview to complete baseline measures (after completing verbal informed consent). Included among several other measures unrelated to the current study, participants were asked to estimate their comparative risk of getting CRC in their lifetime relative to that of other individuals of the same sex, age, and race. They did so using a 5-point scale ranging from *much below average* (1) to *much above average* (5) with “3” labeled “*same as average risk*.” This measure represented perceived comparative risk.

Laboratory Session: After obtaining written informed consent, we administered a brief questionnaire to participants in which we collected all information necessary to compute objective comparative risk using the Harvard Risk Index (Colditz et al., 2000). This included age, height, weight, medical history (e.g., inflammatory bowel syndrome), prescription drug use (birth control, hormone replacement therapy), supplements (vitamins, aspirin), and dietary behaviors and smoking status (as assessed during the baseline interview).

Participants assigned to the *self-affirmation* group ($n = 48$) were then asked to affirm the value of maintaining good health. More specifically, they were asked to “think about things

about you or that you do that you think make you healthier, and talk about them into the tape recorder” during a 3–4 minute period (alone). The instructions were given both in writing and orally by the experimenter. We used taped rather than written affirmations because we were using a community sample for which written essays could be burdensome. It was emphasized that participants should focus on current behaviors and attributes, not behaviors they wanted or wished they could carry out. Participants in the *non-affirmation* group ($n = 46$) and *control* group ($n = 47$) completed a brief unrelated questionnaire during this period.

All participants were then given a brochure which explained the nature and causes of CRC, the functions of the colon and rectum, the most common modes of screening, the overall lifetime risk of getting CRC, and the overall risk of CRC deaths relative to other cancer deaths. The end of the brochure was tailored; it listed the participant’s own risk factors for CRC based on their baseline responses to the same items in the recruitment interview. Participants in the affirmation and non-affirmation conditions also received comparison information suggesting (based on the baseline interview) that they not only had several risk factors that increased their risk but that other people like them had fewer such risk factors. This was expected to exacerbate levels of personal threat relative to the standard (tailored) control. Following a procedure introduced by Lipkus and Klein (2006), participants were told the following:

“You’ve just read about *YOUR* risk factors for colorectal cancer. Again, these are things about you that may put you at *higher* risk. You may also want to know how the total number of risk factors compares to other men[women] from the Pittsburgh metropolitan area. In another similar study, we interviewed 145 men[335 women] between the ages of 50 to 75, and like you, they were asked about their colorectal cancer risk factors. We took the average number of total risk factors they had and compared it to the total number of risk factors you have. Compared to these 145 men[335 women] from the Pittsburgh metropolitan area, you have *more* than the average number of risk factors (emphases in original).”

Note that this comparison feedback was unrelated to the Harvard Risk Index, which relies on a larger set of weighted risk factors and computes a point estimate of the person’s comparative risk. Conversely, the social comparison feedback was based on a smaller number of factors highlighted in the brochure as being related to CRC risk, and was intended to make participants realize that their standing on this particular group of risk factors relative to their peers was even more reason to get a CRC screening test.

After receipt of the feedback, participants completed a questionnaire. Embedded among several items, participants were asked “how likely are you to get a fecal occult blood test within the next six months?” on a 7-point scale from *very unlikely* (1) to *very likely* (7). This represented a measure of intentions. Participants also completed a 10-item multiple choice quiz assessing retention of material in the brochure and attempted to recall the risk factors listed in the brochure. Finally, they were compensated, provided with information about fecal occult blood testing options, given their tailored brochure, and dismissed.

Follow-up: Approximately 6 mo. later, participants were contacted by phone and asked if they had completed any CRC screening test (yes/no) and fecal occult blood testing in particular (yes/no) during the intervening time. Follow-up data were available for 123 participants (87% retention).

Determination of Accuracy Group

Following the experiment, the Harvard Risk Index (Colditz et al., 2000) was used to determine participants’ objective comparative risk (relative to the average same-age, same-sex person). Output is on a nine-point scale from “very much below average” to “very much

above average” with “average” as a midpoint; we used this calculation to divide participants into three groups – below average risk (34%), average risk (12%), and above average risk (54%). As noted earlier, participants estimated their comparative risk on a 5-point scale which we condensed into the same three categories; we found that 38% rated their risk as below average, 55% average, and 7% above average. Objective comparative risk and perceived comparative risk were then cross-tabulated to assess accuracy.

As in previous studies (e.g., Kreuter & Strecher, 1995) participants were categorized as *unrealistically optimistic* (54%) if they believed they were at below average risk when in fact they had average risk, or if they believed they had below average or average risk when they had above average risk. Participants were categorized as *unrealistically pessimistic* (23%) if they believed they were at above average risk when they were at average risk or if they believed they were at above average or average risk when they were at below average risk. Finally, participants were categorized as *realistic* (23%) if their estimates matched the Harvard Risk Index estimate. We defined participants’ categorization as their *accuracy group*.

Results

Preliminary Analyses

There were no condition or accuracy group differences in gender, age, race, highest level of education, or objective risk ($F_s < 1.2$, *n.s.*), and no association between accuracy group and condition ($\chi^2[4] < 6.05$, *ns*). When prompted, participants recalled at least four or more risk factors from the tailored brochure (with no condition differences, $F < 0.5$, *ns*), and 97% were within two of recalling their personal number of risk factors correctly (86% made no errors). Participants answered approximately 70% of the quiz items correctly, and there were no group differences in overall quiz scores ($F_s < 0.72$, *ns*). Some of the quiz items were made difficult in order to create variability in the quiz scores, and thus we did not expect most participants to answer 100% correctly. Overall, then, participants appeared to process the tailored risk feedback information effectively.

Self-Affirmation Manipulation

Two independent raters (blind to accuracy group) coded the taped self-affirmations for number of behaviors avoided, currently engaged in, and intended, as well as for the presence or absence of specific categories of behaviors (e.g., sleep, hygiene, mental health/positive attitude, cognitive stimulation). Inter-reliability was high ($\kappa > .80$) and discrepancies were resolved after discussion. Most participants mentioned diet ($n = 41$) or exercise ($n = 46$). The second most popular behaviors were regular medical care ($n = 23$) and dietary supplements ($n = 24$). Only 12 participants (all female) mentioned cancer screening, and only two of those referred to CRC screening (recall that participants had not yet received any CRC information or feedback at the time they completed the self-affirmation). Another five participants mentioned CRC risk factors (lifestyle, family history, bowel problems) or specific behaviors they perceived to reduce their risk (calcium supplements, monitors bowel habits and changes). A majority of participants (68%) mentioned at least four behaviors or attributes. One participant focused on health behaviors in the abstract and another on how she coped with having another type of cancer; findings were unaffected by inclusion of these data. No significant accuracy group differences were observed for any variable.

Primary Analyses: Intentions to Screen by Accuracy Group and Condition

Screening intentions were analyzed in an omnibus 3 (*condition*: self-affirmed, non-affirmed, or control) x 3 (*accuracy group*: unrealistically pessimistic, realistic, unrealistically optimistic) between-groups Analysis of Variance (ANOVA). This analysis yielded the

predicted two-way interaction, $F(4, 132) = 3.15, p < .02, r = .11$ (and no main effects of condition or accuracy group [$F_s < 1.60, n.s.$]). We followed up this analysis with a series of focused post-hoc tests using the error term and sample size from the omnibus ANOVA ($MS_e = 4.90, N = 141$). To reduce the likelihood of a Type 1 error, we adopted a more stringent threshold for statistical significance at $p < .02$ (and all but one of the reported tests was significant at $p < .01$ or better). Effect sizes are reported in terms of r as recommended by Rosenthal and Rosnow (1991); r s of .10, .30, and .50 can be interpreted as small, medium, and large, respectively (Cohen, 1992).

Lower perceptions of comparative risk were associated with higher likelihood of being unrealistically optimistic ($r = -.38$). Consequently, to ensure that accuracy group explained unique variance in intentions beyond that accounted for by perceived risk alone, we repeated the analysis controlling for comparative risk estimates. The coefficient for risk perceptions was non-significant, and the interaction was unaffected, so risk perceptions were removed from the model.

Main hypothesis: Was self-affirmation beneficial for unrealistic optimists?—

As seen in Table 1, among individuals who were unrealistically optimistic, screening intentions were highest among those who were self-affirmed ($M = 5.00, SD = 2.10$), followed by those in the control group ($M = 4.53, SD = 2.03$) and those in the non-affirmed group ($M = 4.08, SD = 2.26$). All between-group differences were significant ($t_s > 2.40, p_s < .01, r_s > .20$). These findings suggest that giving non-affirmed optimists risk factor information was associated with lower intentions to screen relative to a standard information control, consistent with a defensive posture. Conversely, intentions to screen were higher among optimists when they had an opportunity to self-affirm. These data fully support our main hypothesis, and show not only that self-affirmation can facilitate non-defensive processing among unrealistic optimists but that its absence in the face of threat can foster such defensive processing.

Among those in the self-affirmed group, unrealistically optimistic individuals showed higher intentions to screen than did realistic individuals ($M = 4.00, SD = 2.75$) or pessimistically biased individuals ($M = 3.36, SD = 2.24$), $t_s > 5.37, p_s < .0001, r_s > .41$. In the non-affirmed group, unrealistically optimistic individuals showed *lower* intentions to screen than realistic individuals ($M = 4.50, SD = 2.51$) or pessimistically biased individuals ($M = 5.08, SD = 2.23$), $t_s > 2.25, p_s < .02, r_s > .19$. These differences are consistent with those reported above, although causal interpretation is less clear here because the latter analyses compare individuals across a non-manipulated individual difference.

Finally, within the control group, unrealistic optimists ($M = 4.53, SD = 2.03$) were more likely than realists ($M = 3.50, SD = 2.46$) to intend future screening ($t = 6.99, p < .0001, r = .51$). This pattern is consistent with the idea that unrealistic optimism is not always detrimental. Providing comparative feedback on risk factors without a self-affirmation opportunity appeared to undo these otherwise beneficial effects ($M = 4.08, SD = 2.26$), $t = 2.42, p < .01, r = .20$).

Analyses on unrealistic pessimists and realists—The pattern for unrealistically pessimistic individuals was quite different. Although these individuals were overestimating their comparative risk, they were still overdue for CRC screening and thus should still express high intentions to screen. In the control group, unrealistically pessimistic individuals did indeed express high intentions to get screened with little variability ($M = 6.57, SD = 0.79$). However, providing comparative feedback was associated with lower intentions to screen among non-affirmed unrealistically pessimistic individuals ($M = 5.08, SD = 2.23$), and intentions were even lower among those who were self-affirmed ($M = 3.36, SD = 2.24$),

$ts > 8.01$, $ps < .0001$, $rs > .56$. Thus, whereas self-affirmation was associated with higher intentions to get screened among unrealistically *optimistic* individuals (relative to the non-affirmed group), the opposite pattern emerged among unrealistically *pessimistic* individuals.

Among realists, intentions were highest in the non-affirmed group ($M = 4.50$, $SD = 2.51$), next highest in the self-affirmed group ($M = 4.00$, $SD = 2.75$), and lowest in the control group ($M = 3.50$, $SD = 2.46$). All between-group differences were again significant, $ts > 2.69$, $ps < .005$, $rs > .210$. Thus, for realists, providing social comparison information was associated with higher intentions, but less so when they were self-affirmed.

Screening at 6-mo. follow-up: We then assessed whether unrealistic optimists in the self-affirmed group were more likely to screen by the 6-mo. follow-up (mindful that the study was underpowered for behavioral effects). Among unrealistic optimists, 29% of the self-affirmation group completed a fecal occult blood test compared to 24% of the non-affirmation group and 14% of the control group. Although the difference between the self-affirmed and control groups is in the expected direction, it was not significant ($\chi^2[2] < 1.5$, *n.s.*). The difference between the combined self-affirmed/non-affirmed groups and the control group also was not significant ($p = .15$). A similar pattern emerged for engaging in *any* CRC screening (36%, 30%, and 25%, in the self-affirmation, non-affirmation, and control groups respectively); again these differences were not significant. It is interesting, however, that the non-affirmation group possessed comparable screening rates to those of the self-affirmed group, suggesting that the non-affirmed group had relaxed their defensive posture. Screening rates for fecal occult blood tests among realists and pessimists in the three conditions ranged from 0% to 11% and did not differ significantly. When collapsing across all accuracy groups, there was no effect of experimental condition on actual screening ($F < 1$, *ns*). Of note, intentions measured in the laboratory were significantly related to completion of any CRC screening at 6-mo. follow-up ($r = .18$, $p = .04$).

Discussion

In this study, self-affirmation moderated the relationship between unrealistic optimism and intentions to engage in risk-reduction practices in the context of threatening feedback. When unrealistically optimistic individuals were self-affirmed prior to receipt of risk factor feedback, they were *more* interested in screening than were non-affirmed unrealistic optimists (or even self-affirmed realists and unrealistic pessimists). Conversely, when unrealistic optimists received the threatening information and were *not* self-affirmed in advance, they were relatively *less* interested in screening, suggesting defensive processing. This pattern held even when controlling for subjective risk perceptions, suggesting that unrealistic optimism explained unique variance in intentions.

Among realists and unrealistic pessimists, self-affirmation appeared to be less beneficial. Self-affirmed realists and pessimists expressed relatively less interest in screening than non-affirmed individuals in these groups. Thus, although self-affirmation can be a potentially effective tool in health campaigns, it may need to be tailored to the audience based on their risk perceptions and perhaps other individual differences. These findings suggest that one should measure biases in *a priori* risk perceptions before offering self-affirmation opportunities to recipients of a threatening health message. It may be fruitful to use self-affirmations with high-risk populations given that such individuals are more likely to be unrealistically optimistic (Radcliffe & Klein, 2002; Strecher, Kreuter, & Kobrin, 1995). The counterintuitive findings among pessimists certainly necessitate replication and exploration of potential underlying mechanisms.

Our findings contribute to two significant literatures (unrealistic optimism and self-affirmation) that have yet to be systematically integrated. It would appear that unrealistic optimism can be harmful or beneficial depending on available opportunities for self-affirmation. We can surmise that unrealistic optimists in the non-affirmed condition were accessing the documented panoply of defensive strategies that people use to protect their unrealistically optimistic beliefs. A next step in this research is to determine whether unrealistic optimists who are self-affirmed exhibit a decrease in the accessibility of these strategies. Self-affirmation likely made these individuals act less defensively in response to the risk feedback, making them regard the feedback as more personally relevant (Harris & Napper, 2005). We have found in other work that self-affirmation may also enhance implicit attention to the threatening aspects of a health message (Klein & Harris, in press); to the extent that this is true among unrealistic optimists, the negative effects of this bias on behavior can potentially be reversed.

It is important that the self-affirmation manipulation had the intended effect among unrealistic optimists given that we had individuals self-affirm by discussing their positive health attributes. This approach is easily adopted in a health setting because of high face validity (due to the focus on health) and accessibility (due to use of discussion rather than essay-writing). Nevertheless, it represents somewhat of a departure from conventional manipulations of self-affirmation. Usually participants write about a completely unrelated value (McQueen & Klein, 2006) given that self-affirmations in domains related to the threat can backfire (Blanton, Cooper, Skurnick, & Aronson, 1997; Galinsky, Stone, & Cooper, 2000). Our findings suggest that the value need not be wholly unrelated; our participants did not talk about CRC-related attributes but still focused on health attributes. Of note, studies that demonstrate failed effects of self-affirmations in related domains focus on whether self-affirmation reduces dissonance, rather than whether it promotes less defensiveness in response to a threatening message. In the context of threatening messages, provoking dissonance about one's behavior while concomitantly protecting the self-concept via self-affirmation may be the most effective approach (see also Klein & Monin, 2009).

The observed pattern is also notable given the possibility that self-affirmation might have been predicted to enhance self-serving biases like unrealistic optimism. Notably, self-affirmation does not necessarily appear to exert its effects by elevating state self-esteem or positive affect (Sherman & Cohen, 2006), and has been shown to reduce several biases such as group-serving attributions (Sherman & Kim, 2005) and reinforcement of cultural worldview following mortality salience (Schmeichel & Martens, 2005). Thus, it seems unlikely that self-affirmation would enhance unrealistic optimism and its effects, and there is even evidence that self-affirmation could *be associated with less* comparative bias (Sherman, Cohen, Nelson, Nussbaum, Bunyan, & Garcia, in press). In our study, self-affirmation appeared to also dampen the negative effects of unrealistic optimism, but might also have reduced threat perceptions among individuals who are *not* unrealistically optimistic.

Participants in both of the groups who received comparative risk feedback (self-affirmed and non-affirmed) appeared to complete more CRC screening than the control group, although the difference was not significant. It may be that people initially have a defensive response to threatening comparative feedback, yet become more receptive to its implications over time. In general, social comparison feedback has been shown to have important effects on later behavior (Schmiede, Klein, & Bryan, 2009). Further research should consider the relative impact of social comparison and self-affirmation in the context of risk feedback.

This study was unique in that it took an experimental approach to understanding the effects of unrealistic optimism, measured bias at the level of the individual, used a reasonably

diverse community sample (uncommon in most research on self-affirmation or unrealistic optimism), and measured a non-habitual behavior for which risk perception might be viewed as an antecedent rather than a consequence. However, the study also has limitations. Our main focus was on intentions, not actual screening, although there is evidence that CRC screening intentions are linearly and consistently associated with actual screening (e.g., McQueen, Vernon, Myers, Watts, Lee, & Tilley, 2007), and evidence that self-affirmation can elicit enduring change in other health behaviors (Epton & Harris, 2008). Intentions and actual screening were positively correlated in this study as well, and they may have been even more strongly related had we used a multi-item measure of intention.

We also used only one measure of unrealistic optimism, although this is likely not a major limitation given that people's comparative risk estimates tend to be reliable (Shepperd, Helweg-Larsen, & Ortega, 2003) and given the high validity of the Harvard Risk Index in estimating comparative risk (Colditz et al., 2000). The measure was based on comparative risk perceptions at one time; our data do not speak to unrealistic optimism based on absolute risk perceptions (although we suspect the mechanisms explaining underestimation of risk are consistent across measurement strategies) or to the stability of such perceptions over time.

In addition, we did not check what mechanisms were affected by the self-affirmation manipulation (e.g., self-esteem, self-efficacy), in part because manipulation checks of self-affirmation can unwittingly serve as self-affirmations themselves (Klein & Monin, 2009). We also did not include a group that was self-affirmed without any threatening risk factor feedback; this design decision was predicated on previous findings showing that self-affirmation is ineffectual or perhaps even harmful in the absence of threat (e.g., Harris & Napper, 2005). Finally, cell sizes for realists and unrealistic pessimists in the three experimental groups were relatively small. Importantly, there were sufficient numbers of unrealistic optimists in each cell (approximately 20) to test our main hypothesis that self-affirmation would have a beneficial effect on screening intentions among unrealistic optimists.

Many health interventions are disappointingly ineffective. It is important to acknowledge that health messages and risk feedback might threaten cherished aspects of the self given that people often enjoy distorted positive beliefs about themselves (Taylor & Brown, 1988). Such threats, in turn, lead to defensive processing and may undermine the goals of the intervention (e.g., Croyle et al., 1993; Liberman & Chaiken, 1992). To the extent that people can believe they possess morality, consistency, and integrity, they may be more receptive to a wide variety of potentially threatening messages. If users of self-affirmation techniques are mindful of the audience – a point highlighted here by the negative effects of self-affirmation on screening intentions among unrealistic pessimists and realists – previously ineffective intervention strategies may turn out to be worth another try.

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Table 1

Screening Intentions by Condition and Accuracy of Risk Perception

	Condition		
	Self-Affirmed (<i>n</i> = 48)	Non-Affirmed (<i>n</i> = 46)	Control (<i>n</i> = 47)
Optimistic (<i>n</i> = 76)	5.00 (2.10, 20)	4.08 (2.26, 26)	4.53 (2.03, 30)
Realistic (<i>n</i> = 32)	4.00 (2.75, 14)	4.50 (2.51, 8)	3.50 (2.46, 10)
Pessimistic (<i>n</i> = 33)	3.36 (2.24, 14)	5.08 (2.23, 12)	6.57 (0.79, 7)

Note: Standard deviations and cell sizes appear in parentheses. Intentions were rated on a 7-point scale from 1 = *very unlikely* to 7 = *very likely*.