

Evidence that Mental Contrasting Reduces Health Information Avoidance

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Abstract

Background Although learning health information is beneficial for physical well-being, many people opt to avoid learning this information due to its potentially threatening nature. Such avoidance can lead to delays in seeking treatment.

Purpose This study tested the effectiveness of a self-regulation technique, *mental contrasting* (MC), specifically MC of a negative future with a positive current reality, in reducing health information avoidance regarding skin cancer (melanoma). We hypothesized that participants who engaged in MC would be more likely to choose to learn about their melanoma risk than those who completed a control, reflection activity.

Methods We conducted a randomized controlled trial ($N = 354$). Participants were assigned to complete a MC or reflection (control) exercise prior to filling out a melanoma risk calculator. Participants were then asked whether they wanted to learn their melanoma risk, and how much information they would like to know.

Results Chi-Square tests revealed that MC decreased melanoma risk information avoidance compared to the reflection activity (12% vs. 23.4%) but did not make participants more likely seek additional information.

Conclusion MC is a brief, engaging, and effective strategy for reducing health information avoidance that could prove useful in medical settings.

Lay summary

It is important to know about the status of one's health in order to take necessary precautions for positive health outcomes. However, people may often engage in "information avoidance," which is the tendency to neglect seeking available and potentially valuable health information. Avoiding health information, especially with regards to one's risk for various diseases, is harmful because it can delay timely treatment. In this study, we tested the effectiveness of mental contrasting—a self-regulation technique—in reducing information avoidance for melanoma skin cancer risk. We recruited 354 participants, and they were randomly assigned to engage in the mental contrasting exercise or reflection (control) exercise. The participants then filled out a melanoma risk calculator and were asked whether they would like to learn their risk for melanoma, and how much information they would like to know. The results showed that mental contrasting decreased melanoma risk information avoidance compared to the reflection activity (12% vs. 23.4%) but did not make participants more likely seek additional information. These findings suggest that mental contrasting can be a brief, engaging, and effective strategy for reducing health information avoidance.

Keywords Information avoidance · Health · Mental contrasting · Randomized controlled trial

Introduction

Awareness of the state of one's health is crucial for taking the necessary precautions to obtain positive health outcomes [1]. According to the CDC, approximately 30%–50% of diagnosed cancers could be prevented through cancer screening, which detects cancer during its early stages prior to the onset of symptoms [2]. Such early detection allows for appropriate treatment, thus reducing the likelihood of cancer mortality. However, people often neglect to seek health information. Whereas the American Cancer Society recommends annual breast cancer screening for women between the ages of 45 and 54, only 54% of women in this age group had up-to-date screening in 2019 [3]. Similarly, although colorectal cancer is

the second leading cause of cancer death in American adults, the Behavioral Risk Factor Surveillance System's 2020 survey found that 21.6% of American adults had never been screened for colorectal cancer [4]. Although structural barriers (e.g., low-socioeconomic status, poor accessibility of healthcare) contribute to low rates of screening, another factor is that patients themselves may not want to know about their risk [5]. In fact, findings from a nationally representative survey ($N = 3,630$) found that 39% of participants would "rather not know [their] chance of getting cancer" [6].

This tendency to avoid available and potentially valuable information is known as *information avoidance*. Research suggests that people may choose to avoid information when

such information (a) threatens current beliefs about the self, other people, or the world, (b) creates an obligation to act, or (c) causes negative emotions [7]. For instance, learning that one's risk for cancer is high threatens an individual's beliefs that they are healthy, requires them to adopt appropriate health behaviors and adhere to treatment regimens, and may arouse negative affect [5, 7, 8]. Concerns about experiencing negative emotions accounted for information avoidance across various medical conditions such as Alzheimer's disease, HIV, Huntington's disease, and breast and ovarian cancer [9–12]. Faced with these consequences of learning health information, many individuals adopt a mindset that "ignorance is bliss" [13].

Previous Research on Reducing Health Information Avoidance

Previous interventions have attempted to reduce information avoidance via self-affirmation strategies. According to self-affirmation theory, people are motivated to maintain self-integrity—a global sense of adequacy in the self—and psychological threats to self-integrity trigger defensive coping mechanisms [14]. Self-affirmation strategies thus try to mitigate maladaptive coping by reinforcing self-integrity. A typical self-affirmation exercise involves selecting personally important values from a list, writing a brief essay explaining the reason for the choice, and elaborating on a time when those values were important [15]. Across three studies, Howell and Shepperd found that self-affirmation exercises were effective in reducing avoidance of personal risk information for a fictitious disease [16] (see also ref. [8]). However, self-affirmation may be difficult to implement in medical settings. Self-affirmation exercises can often be time-consuming as they require individuals to define personal qualities and recall past experiences, often in the form of short essays. Moreover, self-affirmation exercises generally avoid including items about the concern at hand (e.g., health) since the goal is to bolster self-integrity by affirming the self in alternative domains [15]. Given this lack of direct focus on the health issue at hand, people may be reluctant to undertake self-affirmation exercises in medical settings when the exercise is not clearly related to the reason for their visit. The current study tests the effectiveness of a more direct approach to reducing health information avoidance. We assess MC, a self-regulation strategy that is brief, easy to implement, engaging, and highly effective in stimulating health behavior change (see ref. [17] for a review).

Mental Contrasting

Mental contrasting (MC) is an imagery exercise that typically involves imagining a desired future state, then identifying negative aspects of one's present reality (obstacles) that stand in the way of that future [18, 19]. For instance, one intervention study targeted physical activity among overweight fishermen [20]. Participants in the MC condition—who were asked to think about their desired future (e.g., feeling healthy), and an obstacle that stands in the way of reaching that goal (e.g., not finding the time to exercise)—demonstrated greater physical activity at 1- and 7-month follow-ups compared to controls. Whereas most of the MC literature involves the realization of positive desired futures, MC has also been found to be effective in promoting behaviors to prevent or avoid undesired negative futures. Negative-future MC employs a procedure similar to its positive-future counterpart: individuals

imagine an undesired future state, then identify a positive aspect of one's present reality that might be lost if the negative future came true. For example, in a smoking cessation intervention, participants were asked to imagine a negative future if they continued to smoke and aspects of their current positive reality that could be lost due to continued smoking [21]. Negative-future MC prompted immediate action to avoid the negative future of falling ill from smoking and participants acted toward reducing their cigarette consumption when expectations of success were high. The effectiveness of negative-future MC has also been demonstrated in promoting COVID-19 preventive behaviors and in facilitating processing of relevant health-related information [22]. Given this track record, MC has the potential to be a promising remedy for health information avoidance. Furthermore, people may find MC easier and more engaging than self-affirmation exercises because it does not try to inculcate cognitive changes such as more positive attitudes or increased self-efficacy regarding the focal behavior [20].

The effectiveness of MC accrues from several underlying mechanisms. Whereas positive thinking about the future, on its own, undermines self-regulation [23], Fantasy Realization Theory (FRT; ref. [17]) proposes that self-regulation is facilitated when people consider an imagined future in relation to their present reality. By inviting participants to reflect upon, and mentally link, their present reality with the imagined future, MC causes a reconceptualization of one's present reality as an "obstacle that stands in the way" of that future [24, 25]. In the context of health information avoidance, an MC exercise that asks participants to identify something positive in their present reality that they might lose as a result of a negative, unhealthy future (a health threat) causes participants to recognize that their current reality stands in the way of that future, and the desire to preserve this reality motivates instrumental behaviors to maintain it (e.g., by learning health-risk information). Lab studies have documented the role of energization (to overcome obstacles) [26] and mental links between the imagined future and current reality [24] and between obstacles in reality and means of overcoming those obstacles [27] as mediators of MC effects (see ref. [28] for a review).

The Current Study

This study offers the first test of MC in reducing health information avoidance. We undertook an online experiment to investigate whether MC involving a negative future and current, still positive reality was effective in reducing participants' avoidance of learning their melanoma risk. We assessed melanoma because it is the deadliest form of skin cancer in the USA, with 7,990 deaths from melanoma projected for the year 2023 [29]. However, early diagnosis and treatment increases one's chances of survival, highlighting the importance of screening. Our study had two conditions: (a) a MC and (b) a control condition that involved a reflection activity. Our dependent variable was participants' decision about which melanoma risk information to receive and had four levels: (a) avoid learning one's risk, (b) learn one's overall risk (default), (c) learn one's overall risk and more information about melanoma, and (d) learn one's overall risk, more information about melanoma, and what one can do to reduce risk. We hypothesized that participants who engaged in MC prior to their decision about learning their melanoma risk would be more receptive to that information (Options 2–4 vs. Option 1) than

control participants. We also examined whether, among those who accepted melanoma risk information, participants in the MC condition would be more likely to seek additional health information (Options 3–4 vs. Option 2) than those in the control condition.

Methods

Participants

Participants were recruited via Amazon Mechanical Turk (MTurk; www.mturk.com) and were paid \$0.60 for undertaking the study. The mean survey length was 9.66 min, and of the 488 participants who signed up for the study, 434 participants completed the survey. We removed 80 participants from the analyses due to nonsensical answers in the MC or reflection activities, yielding a final sample size of 354 participants. Participants were aged 19 and 80 years ($M = 36.92$, $SD = 11.76$) and were predominantly male (57.3%). The sample was Non-Hispanic/Latino White (74.60%), Black or African American (9.30%), Hispanic/Latino White (7.10%), Asian (6.20%) Native Hawaiian or other Pacific Islander (0.80%), American Indian or Alaska Native (0.60%), and 1.4% other or more than one race. Thirty-nine percent of participants were married, and 41.50% had children. Forty-nine percent of participants had a bachelor's or higher degree; 35.30% had incomes under \$40,000; 43.20% had incomes between \$4,000 and \$79,999, and 21.50% had incomes >\$80,000. The research was approved by the institutional IRB and all participants provided informed consent.

Procedure

Participants first provided demographic information: gender, age, race, marital status, parental status, highest level of education, annual household income, and health coverage. They were then asked to complete a three-item scale ($\alpha = 0.88$) that assessed their perceptions of their melanoma risk, containing questions such as: “How likely is it that you will get melanoma at some point in the future?” [30]. Thereafter, participants were randomly assigned via Qualtrics to the MC ($n = 183$) or the active control exercise ($n = 171$). Both exercises consisted of two blocks with a 45-s time minimum to equalize time spent on the activity; participants were informed of the time minimum and asked to take their time answering the questions.

In the first block of the MC condition, participants were asked, “What would be your greatest fear about ignoring your risk of melanoma and avoiding information about this disease?” They were asked to picture this fear in their minds and write down their thoughts and feelings in one or two sentences. During the second block, the MC group was asked, “What could you lose if you ignore your risk of melanoma and information about this disease?” Again, they were asked to picture what they could lose in their minds, and write down their thoughts and feelings in one or two sentences.

The control condition was modeled on the reflection activity used by Howell et al. [31] In the first block, participants were asked to list three reasons why they, or somebody like them, should learn their melanoma risk. They were then asked to indicate the importance of each of those reasons in deciding whether to find out their risk on a 7-point Likert scale (*not at all important—extremely important*). In the second block, participants were asked to list three reasons why they, or somebody like them, should not learn their risk of

melanoma, and rated the importance of those reasons on the same scale. This active reflection activity ensures that control participants reflect on the importance of learning melanoma information to a similar extent as MC participants.

Next, all participants were presented with the following paragraph about the increasing and high prevalence of skin cancer and the seriousness of melanoma: “Skin cancer is the most common cancer in the USA, with more than 3 million new cases diagnosed per year—that is more than all other annual cancer diagnoses combined. One in five Americans develop skin cancer in their lifetime. Rates of skin cancer are also increasing. By 2030, the number of newly diagnosed cases is expected to more than double. Melanoma is the deadliest form of skin cancer, and 20 Americans die from Melanoma every day.”

This paragraph served to inform participants about the menacing nature of skin cancer and melanoma, thereby inducing a strong sense of threat. Next, participants were told that they would be asked questions from the National Cancer Institute (NCI)'s Melanoma Risk Assessment Tool, a tool used to assess individuals' personal risk of melanoma. They then proceeded to fill out the assessment. In addition to items from the NCI's Melanoma Risk Assessment Tool, we included questions designed to increase participants' perceived threat of melanoma (e.g., “When outside for more than 10 min on a day that is hot and sunny, how often do you cover your arms and legs?”). Upon the completion of this assessment, the dependent variable was measured. Participants were given four options about the information they wished to receive concerning their risk of melanoma: (1) “submit without learning my risk,” (2) “submit and learn my overall risk,” (3) “submit and learn my overall risk and more information about melanoma,” or (4) “submit and learn my overall risk, more information about melanoma, and what I can do to reduce my risk.” The default, Option 2, was indicative of information acceptance, and any deviations from that option revealed an active choice to avoid or seek information. Option 1 was indicative of active information avoidance, whereas Options 3 and 4 represented increasing levels of information seeking. Regardless of the choice they made, participants were not actually given a melanoma risk score and continued to the debriefing where they were told that the risk calculator was created for research purposes.

Results

Randomization Check

Chi-square and *t*-tests revealed no differences between the MC and control groups on demographic variables (age, gender, race, education, income, marital, and parental status) or melanoma risk perceptions (all $ps > .11$). Thus, randomization was successful.

Impact of MC on Information Avoidance

Choice of information differed between the MC and control groups, $\chi^2(3, N = 354) = 8.98, p = .030$ (see Fig. 1). Planned comparisons explored whether participants in the MC condition were (a) less likely to avoid learning their risk and/or (b) more likely to seek additional information than control participants. We first examined avoidance of risk versus all other categories by condition and found that a significantly smaller percentage of those in the MC group (12.00%) avoided risk information compared to the control group (23.40%), $\chi^2(1, N$

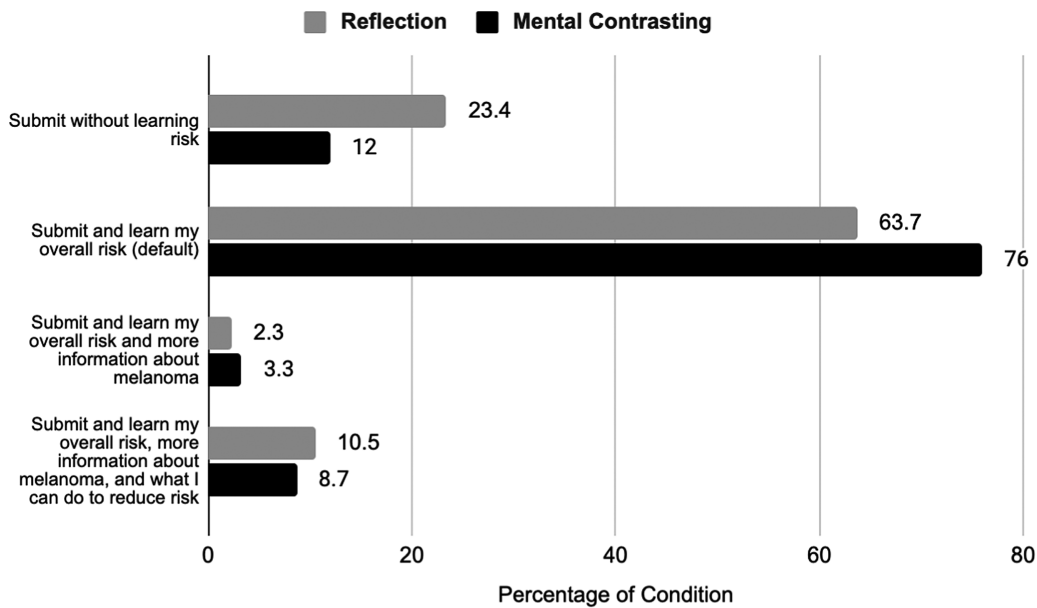


Fig. 1. Information choice by condition.

= 354) = 7.91, $p = .005$. Findings were equivalent when participants who failed the manipulation checks were included in the analyses (14.8% vs. 22.7%), $\chi^2(1, N = 434) = 4.47, p = .035$. We then tested whether MC participants were more likely than controls to seek additional information by looking at the three acceptance options by condition. The Chi-Square test was not significant, $\chi^2(2, N = 292) = 1.08, p = .584$. Thus, whereas MC participants were more likely to choose to learn their melanoma risk than control participants, they were no more likely than control participants to seek additional information.

Discussion

The results supported our primary hypothesis that negative-future MC reduces health information avoidance. Participants who engaged in MC were almost half as likely to avoid learning their melanoma risk compared to participants in the control group. The results did not support the idea that participants in the MC group would be more likely to seek additional information about their melanoma risk compared to those in the control group. This suggests that while MC of a negative future with the endangered positive reality helped make the leap from avoidance to acceptance of health information, it did not motivate individuals to take additional action to learn more about their risk and ways to reduce their risk.

Why did MC reduce information avoidance but did not promote information seeking? Two explanations seem possible. First, the survey provided participants with a good deal of information about melanoma and risk behaviors, and thus participants may have felt that they had gained sufficient knowledge. Second, our MC intervention was geared at reducing information avoidance rather than motivating the acquisition of further information. Participants were asked, “What would be your greatest fear about ignoring your risk of melanoma and avoiding information about this disease?” and then asked, “What could you lose if you ignore your risk of melanoma and information about this disease?” The MC

induction thus emphasized the importance of not ignoring risk information but did not speak to the value of gaining additional information. A useful direction for future research might be to modify our MC intervention so that avoiding ignorance and gaining new knowledge are both emphasized (e.g., “What would be your greatest fear about ignoring your risk of melanoma and failing to learn as much information as possible about this disease?”).

Our study is the first to demonstrate the effectiveness of negative-future MC in reducing cancer-related health information avoidance. Whereas most studies of MC involve imagining a desired positive future followed by obstacles in one’s current reality that stand in the way of that future (i.e., positive-future MC), negative-future MC may be especially apt for contexts like health screenings that evoke thoughts of an undesirable possible future. By emphasizing a positive reality that could be lost due to information avoidance, negative-future MC highlights the response necessary to maintain that positive reality (e.g., learning one’s health risk) and motivates health behavior change. This has important implications for screening interventions. Presented with the threat of a potentially negative health report, individuals tend to become defensive and avoid learning their health information [6]. While such avoidant coping may reduce feelings of threat in the short-term, failing to gain valuable health information can lead to delayed diagnosis of diseases, increasing the risk of serious illness. Given its simplicity and brevity, negative-future MC may represent a scalable intervention that could be implemented during visits to the doctor, and aid patients’ receptiveness to health information. Moreover, as MC exercises ask patients to think about a future and present that are directly related to their medical visit, patients may be more willing to engage in MC than a self-affirmation exercise.

The present research has both strengths and limitations. Key strengths include the use of a task-based measure of information avoidance (and not merely hypothetical preferences), and the use of an active control condition that proved effective in reducing health information avoidance in previous research [31]. Limitations include the use of a convenience

online sample that may over-represent younger, better educated European and Asian Americans [32]. Although there is evidence that experiments with MTurk samples demonstrate the same statistical significance and direction of effects as probability samples [28], further research with representative and clinical samples would be valuable to corroborate our findings. Another limitation is that our study did not explore the mechanisms that explain why negative-future MC is effective in reducing information avoidance—because it was not feasible to obtain physiological measures of energization [26] or response latency measures of implicit cognition [24, 27]. Although the mechanisms that drive positive-future MC should also apply to the negative-future manipulation, there could be additional factors at play. For instance, previous research indicates that protecting beliefs about the self, others, and the world, and escaping negative emotions or feelings of obligation to act may underlie information avoidance [7]. It is possible that our MC exercise caused the pain of losing a positive reality to become salient, and this consideration outweighed concerns about the self or negative feelings. However, new studies are needed to confirm this possibility and test the mechanisms underlying MC effects in relation to information avoidance (see ref. [33] for a review).

Notwithstanding these limitations, the present research offers both theoretical and practical contributions. At the theoretical level, our study underlines the value of MC—particularly the role of negative-future MC—for promoting health behaviors. To our knowledge, negative-future MC geared at preventing ill health in the future has only been tested on COVID-19-preventive behaviors and smoking cessation to date [21, 22]. Our study is the first to test the effectiveness of MC on health information avoidance, and the findings add reduction of health information avoidance to the repertoire of health behaviors that can effectively be targeted with this approach. In addition, our research contributes to the understanding of information avoidance for melanoma, which—although only accounting for 1% of skin cancer cases—is the deadliest form of skin cancer [29].

At the practical level, our study may offer directions for interventions to address cancer screening gap (the ratio of recommended to actual screenings for cancer). The recent COVID-19 pandemic caused disruptions in cancer screening in the USA, leading to an estimated 9.4 million missed screenings in 2020 [34]. Consequently, the need for closing the cancer screening gap is especially critical today. Deploying negative-future MC in health communications could contribute to addressing this gap. For example, reminder emails and pamphlets designed to persuade individuals to obtain regular screening could implement MC exercises similar to those used here. While our study focused on melanoma information avoidance, an important direction for future studies will be to investigate whether negative-future MC is similarly effective for promoting behavior change in non-fatal medical conditions (e.g., dental cavities, hearing loss) or large-scale health threats (e.g., climate change). It would also be important to explore whether the same mechanisms at play for MC with a positive future (e.g., energization, mental links between the present reality and imagined future, and mental links between obstacles in reality and means of overcoming those obstacles) also apply to MC with a negative future, as most of the existing literature on mechanisms are specific to positive-future MC. In sum, the present study suggests several avenues for future research (behavioral domains, underlying mechanisms,

implementation of MC in health settings) that can and should be explored.

Compliance with Ethical Standards

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards Michelle (Zhiqing) Yang, Willa C. King, Gabriele Oettingen, Paschal Sheeran declare that they have no conflict of interest. All procedures, including the informed consent process, were conducted in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Authors' Contributions Zhiqing Yang (Conceptualization: Equal; Visualization: Lead; Writing – original draft: Lead; Writing – review & editing: Equal), Willa C. King (Conceptualization: Equal; Formal analysis: Equal; Investigation: Equal; Methodology: Equal), Gabriele Oettingen (Conceptualization: Equal; Writing – review & editing: Equal), and Paschal Sheeran (Conceptualization: Equal; Project administration: Lead; Supervision: Lead; Validation: Lead; Writing – review & editing: Lead)

Ethical Approval The project was approved by UNC's IRB. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study. The article does not contain identifying information about participants.

Transparency statements This study was not formally registered. The analysis plan was not formally pre-registered. De-identified data from this study are not available in a public archive. De-identified data from this study will be made available (as allowable according to institutional IRB standards) by emailing Paschal Sheeran.

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