
Research Article

Getting to the Heart of the Matter in Later Life: The Central Role of Affect in Health Message Framing

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Abstract

Background and Objectives: Adopting healthy behaviors is often influenced by message framing; gain-framed messages emphasize the benefits of engaging in a behavior, whereas loss-framed messages highlight the consequences of not engaging in a behavior. Research has begun to uncover the underlying affective pathways involved in message framing. In the current study, we examined the role of affect in message framing to encourage exercise program enrollment among older adults.

Research Design and Methods: We mailed flyers to 126 volunteers assigned to a gain- or loss-framed condition and measured their affective reactions to the flyer and enrollment intentions. After the call, participants had the opportunity to contact us to enroll.

Results: Gain versus loss framing led to more positive affect toward the flyer, which predicted intentions and enrollment effort. In indirect effect analyses, frame indirectly influenced intentions and enrollment effort via positive affect.

Discussion and Implications: Although message framing plays an indirect role in influencing behavior, affect plays a central role.

Keywords: Aging, Decision making, Emotions, Health, Message framing

Theoretical perspectives emphasizing the role of emotions in decision making are starting to challenge long-held assumptions from a historical focus on cognitive explanations; decision making depends not only on cognitive processes and evaluations but, perhaps more significantly, on emotional reactions as well (Lerner et al., 2015; Loewenstein et al., 2001; Slovic et al., 2005). The role of affect as an integral source of information in decision making can be aptly considered within the larger context of dual-process theories that draw the distinction between two general processing streams: intuitive and deliberative (Epstein, 1994; Kahneman, 2003). One dual-process perspective, cognitive-experiential self-theory (CEST), includes affect as

a central component of the intuitive system (Epstein, 1994). Specifically, according to CEST, behavior and decisions are generally guided by integrating affect-laden experiential and rational-analytic streams of information.

Importantly, affective relative to cognitive explanations also appear to have surprising utility in understanding adult life-span differences in decision making generally (Mikels et al., 2015; Peters et al., 2007). Understanding decision-making processes in later life has major implications given that the proportion of older adults in Western societies is approaching unprecedented levels. For instance, in the United States, nearly 20% of the population will be aged 65 or older by 2030 (United States Census

Bureau, 2012). Largely because of this demographic shift, health expenditures are approaching 20% of the U.S. gross domestic product (Cuckler et al., 2013). As greater numbers of older adults are faced with making important health decisions, understanding the most effective strategies for increasing healthy behaviors—and the underlying causal pathways—has never been more critical. The current study was designed to examine the affective mechanisms underlying health behavior decisions.

Given the impactful role of emotion in decision making, an understanding of this relationship can be used to more effectively tailor health messages to facilitate behavior change. Message framing has been examined in numerous health domains including disease prevention (e.g., physical activity and diet) and disease detection (e.g., breast cancer and skin cancer; Rothman & Salovey, 1997). In particular, gain-framed messages that emphasize the benefits of engaging in a specific behavior are theorized to be more influential for prevention relative to loss-framed messages that highlight the consequences of not engaging in a particular behavior, which are thought to be most influential for detection (Rothman & Salovey, 1997). According to the framework of Rothman and Salovey (1997), gain-framed messages can either take the form of acquiring desirable outcomes or avoiding undesirable outcomes and vice versa for loss-framed messages. Recent meta-analyses have provided partial support for the greater impact of gain-framed versus loss-framed messages in encouraging preventative behaviors—such as exercise—but the effects are inconsistent (Gallagher & Updegraff, 2012; O'Keefe & Jensen, 2006, 2007). The tenuous link between message framing and behavior reflects the multifaceted and complex causal pathways from framing to behavior including mediators such as attitudes about the behavior, perceived effectiveness of the messages, and intentions to engage in the behavior (Dillard et al., 2007; van't Riet et al., 2010).

Although these cognitive mediators have underscored the complexity of message-framing effects, only recently have affective pathways been considered. In particular, it is becoming increasingly clear that gain- versus loss-framed messages evoke different affective reactions, such that gain-framed messages evoke positive affect, whereas loss-framed messages evoke negative affect (Liu et al., 2019; Mikels et al., 2016; van't Riet et al., 2010). Importantly, the greater positive affect evoked by gain-framed messages is associated with higher perceived effectiveness of the messages, especially for older adults (Liu et al., 2019). Moreover, evidence suggests that gain-framed messages lead to higher positive affect, greater information acceptance, and more positive attitudes (van't Riet et al., 2010). But do these changes in perspective lead to *changes in actual behavior*? The current study sought to address this question through a field study using message framing to increase actions toward healthy behavior in a naturalistic setting.

One preventative health domain in which decisions can have impactful consequences is exercise, especially for older adults. It is well known that regular exercise improves

physical health for people of all ages (Emery & Gatz, 1990; Hillman et al., 2008). However, this is especially true for older individuals who generally experience disproportionate physical and cognitive declines relative to younger adults (Prakash et al., 2015); not only is exercise linked to improved cardiovascular function, greater muscle strength, and better balance for older adults, but there are also improvements in executive control processes (Colcombe & Kramer, 2003; Cress et al., 1999; Howe et al., 2011; Hughes et al., 2004; Liu & Latham, 2009; Sherrington et al., 2011; Whitehead & Blaxton, 2017). Despite strong evidence for the importance of regular physical activity, 40.3% of younger adults (aged 18–44) and 59.4% of older adults (aged older than 65) fail to meet the recommended levels of aerobic exercise and muscle strengthening (National Center for Health Statistics, 2015). Thus, one of the most important preventive health domains for message framing to target is physical activity. Notably, gain-framed messages have been shown to increase walking for older adults (Notthoff & Carstensen, 2014). However, the mechanisms resulting in this behavioral effect are not entirely clear. Extant evidence suggests that older adults find gain- versus loss-framed messages more motivating (Notthoff et al., 2016) and that older adults better remember gain- versus loss-framed messages (Notthoff et al., 2016; Shamaskin et al., 2010). Thus, motivation and memory likely play an underlying role in the behavioral effects of message framing. Nonetheless, given that gain-framed messages elicit positive affect, which is associated with higher perceived effectiveness (Liu et al., 2019), important yet unknown key mechanisms operating in the effects of message framing on behavior may be affective in nature.

The current study was designed to examine *how* affective reactions to preventative health messages influence intentions and actual behavior. We focused on exercise, given its broad and profound influence on physical and psychological health. Moreover, we focused on older adults insofar as they are most to benefit from exercise and show a preference toward positive messages (for a review, see Mikels et al., 2015). We predicted that gain-framed health messages would have their effect on intentions and actual behavior via positive affective responses, beyond commonly measured cognitive evaluations such as perceived effectiveness (Dillard et al., 2007).

Method

Participants

The sample consisted of 126 participants (M age = 71.75, SD = 7.83, 69.8% women), who were recruited generally to participate in our research studies from the Chicago area via a newspaper advertisement in two local newspapers with a total circulation of approximately 200,000 readers. If enrolled in the current study, they were compensated with a \$30 gift card. The experiment was approved by DePaul University's Institutional Review Board. Table 1 presents data regarding the

demographic, health, and affective characteristics of the participants in each condition. The two groups differed in positive and negative state affect, $p < .05$.

Materials

Exercise program flyers

The study used two flyers advertising an exercise program for older adults: a gain-framed flyer and a loss-framed flyer (Figure 1). The gain-framed flyer used benefit-focused messaging, which emphasized the benefits of engaging in exercise. For instance, the focal message, "Exercising will improve your health," was followed by several additional gain-framed items. The loss-framed flyer used consequence-focused messaging, which highlighted the consequences of not exercising. For instance, the focal message, "Not exercising will increase health problems," was followed by the consequential alternatives to the original messages.

Current state affect

To measure state affect, we adapted the modified differential emotional scale (mDES; Fredrickson et al., 2003). The scale is a measure of current state affect with 11 positive emotions (amusement, awe, compassion, contentment, gratitude, hope, interest, joy, love, pride, and surprise) and 8 negative emotions (anger, contempt, disgust, embarrassment, fear, guilt, sadness, and shame). Participants respond as to the extent they are experiencing each emotion/feeling at the present moment on a scale of 1 (*not at all*) to 5 (*extremely*). A participant's positive and negative emotional state was calculated by averaging the 11 positive emotions and the 8 negative emotions, respectively.

Immediate affective reactions toward the flyer

Participants were asked to rate how they felt about three separate elements of the flyer (as demarcated in Figure 1): (a) the text in the red box, (b) the three sentences in the

second section, and (c) the statements in the third section. Each element was rated on a 1 (*very negative*) to 6 (*very positive*) scale. Overall feelings toward the flyer were calculated by averaging the ratings across the three measures.

Flyer perceived effectiveness

Participants were asked to rate how effective the three flyer elements were in convincing them to exercise (as described above and demarcated in Figure 1). Each participant rated how effective the flyers were on a 1 (*very ineffective*) to 6 (*very effective*) scale.

Enrollment intentions

Participants were asked to rate how interested they were in joining the exercise program after the fourth section of the flyers (see Figure 1). Each participant rated how interested they were on a 1 (*not at all*) to 5 (*extremely*) scale.

Behavioral action toward enrollment (enrollment effort)

To measure behavioral action, participants were given an opportunity to take action to enroll in the exercise program. They were able to either mail in a postcard or enter their name in a secure website. Action to enroll was either coded "1" for participants who took action and "0" for participants who did not.

Procedure

Upon expressing interest in the study, potential participants answered calls by the researchers, and the study was conducted in two parts by phone. First, the participants completed an initial phone screening and we obtained verbal informed consent. If they agreed to participate, participants set up a schedule to receive a mailed packet (containing the flyer as well as a postcard) and a follow-up phone call approximately a week following the mailing of the packet. We emphasized in the instructions during the call that they were not to open the envelope until they

Table 1. Participant Characteristics by Frame Condition

	Gain, N = 63	Loss, N = 63	Statistic	
	M (SD)	M (SD)	t	p
Age (in years)	71.92 (7.90)	71.56 (7.76)	0.26	.79
Sex	37.3% F, 12.7% M	32.5% F, 17.5% M	1.16	.25
Highest level of education	7.95 (1.88)	7.91 (1.89)	0.14	.89
Scaled income	10.81 (8.56)	9.97 (8.63)	0.55	.58
Physical health	47.73 (11.04)	48.98 (9.14)	0.69	.49
Mental health	50.58 (11.78)	53.05 (7.98)	1.38	.17
Positive state affect	2.95 (0.80)	3.22 (0.70)	-2.05	.042
Negative state affect	1.64 (0.65)	1.41 (0.51)	2.23	.028

Notes: Sex: F = female, M = male; highest level of education: on a scale of 1–11 (with 1 indicating "No schooling completed" and 11 indicating "Doctorate degree"); income: on a scale of 1–12 (with 1 indicating "Less than \$10,000 and 12 indicating "More than \$150,000"); physical and mental health norm-based composite scores from the SF-36; positive state affect: an average of 10 positive emotions on a scale of 1–5 (with 1 indicating "not at all" and 5 indicating "extremely"); negative state affect: an average of 9 negative emotions on a scale of 1–5 (with 1 indicating "not at all" and 5 indicating "extremely").

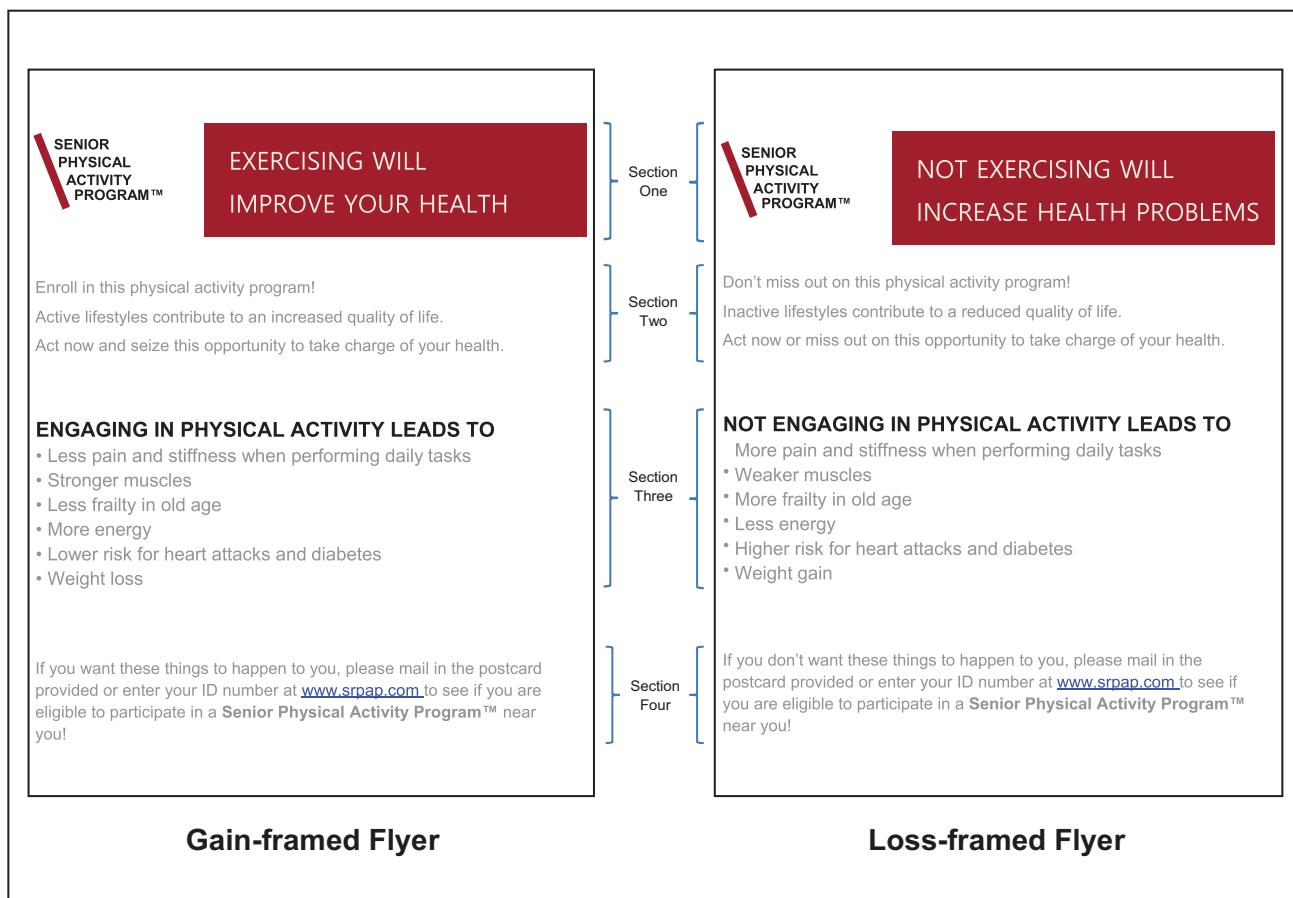


Figure 1. Exercise program flyers.

received the second call. Additionally, we sealed the envelope with a large label stating in large bold font to not open the envelope until they received a call from us. During the second phone call, participants first completed the mDES, opened the packet, then read the sections of the flyer to the experimenter, were asked how they felt about and their perceived effectiveness of the three sections of the flyer, and finally after reading section four were asked about their intentions in joining the exercise program. They were then given an opportunity to send in a postcard or visit a website to take action toward joining the exercise program.

Results

Our analyses focused on the role of immediate affective reactions relative to cognitive evaluations in the influence of gain- versus loss-framed messages on intentions to enroll in the exercise program as well as taking action to enroll in the exercise program. First, we examined the influence of gain- versus loss-framed messages on immediate affective reactions toward the flyer, perceived effectiveness of the flyer, intentions to enroll in the exercise program, and action to enroll in the exercise program. Next, analyses examined whether immediate affect toward the flyer and/or perceived effectiveness predicted intentions in the exercise program and enrollment effort to join the exercise program. Finally, two mediation

analyses examined if there were indirect effects (IEs) of gain- versus loss-framed messages on intentions in the exercise program and action to enroll in the exercise program via immediate affect toward the flyer (controlling for perceived effectiveness). Given the group differences in incidental state affect, all analyses were conducted with and without controlling for positive and negative state affect as measured by the mDES. State affect did not change the pattern of results regarding the effect of frame on immediate affective reactions, effectiveness, or the IEs of frame on intentions and effort to enroll. As such, the following analyses are reported without controlling for incidental state affect.

The Influence of Frame on Immediate Affect, Effectiveness, Intentions, and Action to Enroll

A multivariate analysis of variance was conducted to examine the effect of frame on immediate affect toward the flyer, perceived effectiveness of the flyer, and intentions to enroll in the exercise program; for means, see **Table 2**. The analysis revealed a significant effect of gain- versus loss frame on immediate affect toward the flyer ($F(1, 124) = 16.36, p < .001, \eta^2 = 0.117$), such that gain frames evoked more positive affect than loss frames. Considering possible sex differences in affective reactions, immediate affective reactions did not differ by

sex. Regarding the other measures, frame did not have an effect on effectiveness or intentions. Furthermore, a logistic regression showed that there was no direct effect (DE) of frame on action to enroll.

Did Immediate Affect or Perceived Effectiveness Predict Intentions and Action to Enroll?

Four separate regression analyses examined if immediate affect and/or perceived effectiveness toward the flyer predicted intentions and enrollment effort (note that immediate affect and perceived effectiveness were correlated, $r = 0.60$, $p < .001$). The first regression examined if immediate affect predicted intentions to enroll in the exercise program. This analysis revealed that the more positive immediate affect was toward the flyer, the greater intentions there were in the exercise program ($\beta = 0.569$, $SE = 0.088$, $p < .001$, 95% confidence interval [CI]: 0.40–0.74, $\eta^2 = 0.25$). Logistic regression was used to examine whether immediate affect predicted enrollment effort. This analysis revealed that more positive immediate affect toward the flyer significantly predicted an increased probability of taking action to enroll in the exercise program ($\beta = 0.107$, $SE = 0.044$, $p < .02$, odds ratio [OR] = 1.11, 95% CI: 1.02–1.21). The third analysis examined whether perceived effectiveness

predicted intentions to enroll in the exercise program. This analysis revealed that higher perceived effectiveness significantly predicted increased intentions to enroll in the exercise program ($\beta = 0.629$, $SE = 0.07$, $p < .001$, 95% CI: 0.48–0.77, $\eta^2 = 0.37$). Then a logistic regression analysis examined if perceived effectiveness predicted enrollment effort. This analysis revealed that perceived effectiveness marginally predicted increased probability to take action to enroll in the exercise program ($\beta = 0.355$, $SE = 0.18$, $p = .051$, OR = 1.43, 95% CI: 1.02–2.09).

Did Frame Have an IE on Intentions and Action to Enroll in the Exercise Program via Immediate Affect?

Given that frame had a DE on immediate affect but not perceived effectiveness, the analyses only examined immediate affect. Two separate IE analyses examined whether there was an IE of gain- versus loss-framed messages on intentions to enroll in the exercise program and action to enroll in the program (Figure 2). Both analyses used Hayes' (2009) method for examining IEs. Additionally, both analyses used the mediation package (Tingley et al., 2014) in R (R Core Team, 2013) to estimate the causal mediation effect (IE) and the DE. Both the IE and DE estimates

Table 2. The Influence of Frame on Affective Reactions, Ratings of Effectiveness and Intentions, and Action to Enroll

	Gain, N = 63	Loss, N = 63	Statistic		<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
Immediate affective reactions	5.41 (0.671)	4.73 (1.16)	<i>F</i>	16.36	<.001
Perceived effectiveness	5.04 (1.01)	4.95 (1.19)	<i>F</i>	0.185	.668
Enrollment intentions	3.51 (1.09)	3.38 (1.18)	<i>F</i>	0.392	.532
Action to enroll	43.0%	49.2%	β	0.256	.475

Frame indirectly influenced intentions to enroll via the manipulation of immediate affect experienced toward the flyer (IE: $\beta = .42$, 95% CI = .20, .68, $p < .001$)

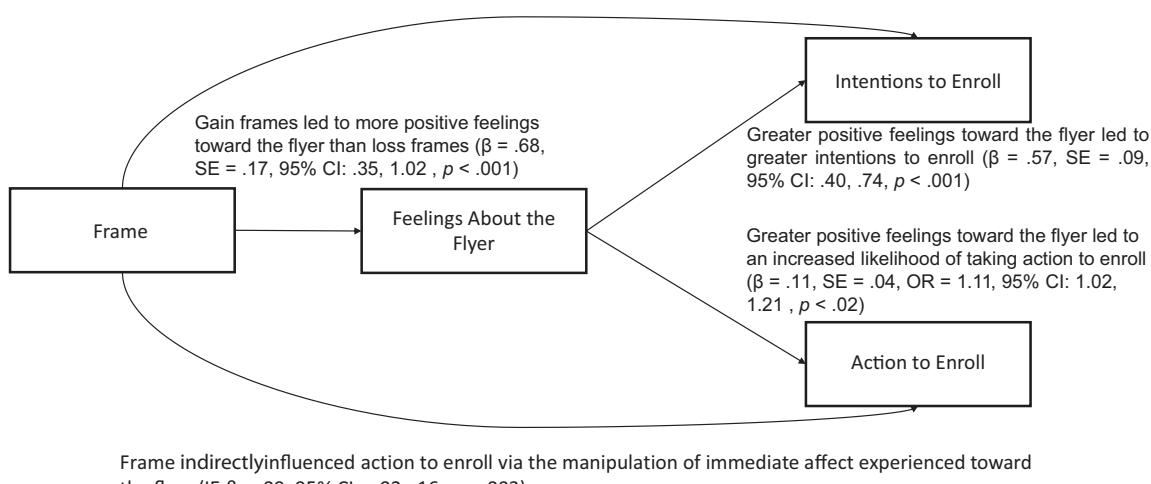


Figure 2. Indirect effect analyses examining the role of immediate affect in the effect of frame on intentions and enrollment effort. Note: These statistics are reported without controlling for perceived effectiveness.

were computed using 5,000 bootstrapped samples, and the 95% CI was computed by determining the IE and DE at the 2.5th and 97.5th percentiles.

The first analysis examined whether frame indirectly influenced intentions via immediate feelings toward the flyer. This analysis indicated that there was an IE of frame on intentions via immediate feelings toward the flyer (IE: $\beta = 0.42$, 95% CI: 0.20–0.68, $p < .001$). Compared to the loss frame, the gain frame was associated with increased intentions to enroll in the exercise program via more positive immediate affect toward the flyer. The IE remained significant even when controlling for perceived effectiveness (IE: $\beta = 0.17$, 95% CI: 0.03–0.33, $p < .02$).

The second analysis examined whether frame indirectly influenced action to enroll via immediate feelings toward the flyer. This analysis indicated that there was an IE of frame on enrollment effort via immediate feelings toward the flyer (IE: $\beta = 0.09$, 95% CI: 0.02–0.16, $p < .003$). Compared to the loss frame, the gain frame was associated with an increased likelihood to take action to enroll in the exercise program via more positive immediate affect toward the flyer. As with the first analysis, here too, the IE remained significant when controlling for perceived effectiveness ($\beta = 0.07$, 95% CI: 0.001–0.15, $p = .041$).

Discussion

The findings of the current field study revealed a central role for affect in the influence of framing on intentions, but more importantly, on enrollment effort. In particular, message framing had IEs on the outcome measures via feelings about the messages but not via evaluative judgments of perceived effectiveness. Gain- versus loss-framed messages evoked more positive feelings about the messages, which in turn predicted intentions to enroll in the program and behavioral action to enroll in the program. These results are the first to directly link message framing to *actual behavior* via an affective pathway.

This work was conducted in the important preventative health domain of exercise, for which message framing may have an impact. Importantly, though, in this study, the actual frame of the message was not as influential on intentions or enrollment effort as the immediate affective reactions of individuals to the messages. In other words, the greater the extent to which loss-framed messages elicited positive affect predicted greater intentions and behavior. As such, these results suggest that message framing aimed at preventative behaviors is effective only to the degree to which it elicits positive affect. It is interesting to note that the immediate affective reactions did not differ by sex, suggesting that extraneous factors such as sex may not have a strong effect on affective responses to message framing.

Although these results are compelling, there are caveats. First, the sample only included older adults, for whom increasing exercise is especially beneficial given their disproportionate physical and cognitive declines relative to younger adults (Prakash et al., 2015). Given age differences in

motivation and emotion (Carstensen, 2006), it is possible that individuals of different ages may respond differently. Thus, examining message framing across the adult life span could provide additional insights. Also, including other preventative health domains (e.g., diet and nutrition, safer sex practices, and dental hygiene) would provide greater generalizability. Finally, the current finding that frame did not affect perceived effectiveness deserves further consideration. Whereas Liu et al. (2019) found that gain-framed messages were perceived to be more effective than loss-framed messages, this effect was not found in the current study. However, we did find that more positive immediate affect was significantly associated with higher perceived effectiveness, partially replicating Liu et al. (2019). This discrepant pattern may be due to methodological differences (e.g., sample and design).

In summary, the current work is the first to demonstrate the role of affect in the pathway from message framing to behavior. Creating preventive messages that evoke positive affect may be the most effective way forward in efforts to increase healthy behaviors. Ultimately, the path toward preventive health—as influenced by persuasive messaging—appears intrinsically linked with positive affect.

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Conflict of Interest

None declared.

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