



Differential effects of instrumental vs. experiential attitudes on health behavior intentions: Evidence from a college-based cancer prevention campaign

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ARTICLE INFO

Keywords:

Health campaigns
Attitudes
Cancer prevention
Behavior change

ABSTRACT

This study is an exploratory analysis of data from a long-running health promotion effort at a two-year college. This campaign has consistently improved sun safety behavior and bolstered the campus tobacco-free policy, thus, new messaging directions were investigated based on cognitive predictors. Efforts were made to compare the relationships between attitudes regarding outcomes of health behaviors (i.e. instrumental) and attitudes regarding feelings and sensations experienced during a behavior (i.e. experiential) on behavior intentions. Evidence emerged that instrumental attitudes were more positive and more predictive of intentions for sunscreen use, sunscreen dispenser use, and quitting tobacco/nicotine use. Experiential attitudes were stronger predictors of tanning behavior and using tobacco/nicotine products. Only for tanning behavior did the relationship between instrumental attitudes and intentions depend on experiential attitudes. Messaging implications are discussed. The goal of this manuscript is to demonstrate a process for utilizing additional data from evaluation to inform strategic improvements to long-term health communication efforts.

A core principle of health communication is that strategy is a cyclical, iterative process (National Cancer Institute, 2013; Lee and Kotler, 2020). Specifically, health communicators must “work through a continuous loop of planning, implementation, and improvement,” (NCI, 2013; p. 11). An accepted best practice is to use formative research and message pre-testing to inform an intervention before full implementation (Noar, 2006; NCI, 2013), which is a recommendation followed consistently (Willoughby & Noar, 2022). Another best practice calls for adjusting messages and strategy after implementation (NCI, 2013). Unfortunately, health campaigns research rarely report on the message design process and any adjustments made throughout implementation (Willoughby and Noar, 2022; Getachew-Smith et al., 2022).

The theoretical frameworks used most often to create health messages, including the theory of planned behavior, health belief model and social cognitive theory, are all considered “reasoned action approaches” with shared principles and constructs (Head and Noar, 2014; Anker et al.,

2016; Willoughby and Noar, 2022; Fishbein and Ajzen, 2010). The reasoned action approach posits that a variety of ‘background factors’ such as demographic variables, personality traits, and media exposure drive the formation of beliefs. In turn, these beliefs form the basis of a) attitudes, b) subjective norms, and c) perceived behavioral control, which then predict behavioral intention and behavior (Fishbein & Ajzen, 2010). The reasoned action approach holds that behavioral intentions exist and that they predict real-world behavior under certain conditions.

The reasoned action approach is suitable for behavior change interventions because it allows for beliefs, which are ephemeral non-static units, to be modified by communication exposure. The model also accounts for changes in the behavioral context that are material, such as a tobacco-free policy or sunscreen dispensers. Beliefs and other non-psychological factors, like physical barriers, are the behavioral determinants, and communication campaigns and policy changes are the behavior change techniques available to modify beliefs.

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<https://doi.org/10.1016/j.evalprogplan.2026.102816>

Received 3 December 2025; Received in revised form 31 August 2026; Accepted 2 September 2026

Available online 15 September 2026

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Although there is extant research on the reasoned action approaches for formative research, intervention design, and evaluation, less research has been done on how the reasoned action approaches can be harnessed for iterative improvements to long-running health campaigns. Therefore, the goal of this study is to show how planners can return to reasoned action theories and use data from an evaluation to make iterative improvements to health promotion efforts through exploratory analysis of cognitive factors.

1. The reasoned action approaches and belief-based messaging

One area where health communication scholarship has excelled in recent years is incorporating theory into the planning process (Willoughby & Noar, 2022), with the most popular framework being the reasoned action approach (Head and Noar, 2014; Anker et al., 2016; Willoughby and Noar, 2022). Reasoned action fits in at the message strategy phase (Yzer, 2012; Hornik and Woolf, 1999). Reasoned action answers the core strategic question of *what* messages should be about, contrasted with processing theories and message effects theories that help answer questions about *how* to message on a topic (Cappella, 2006; Fishbein and Ajzen, 2010). Reasoned action approaches, also known as behavior change theories, cannot guide intervention planning alone and must be integrated with other theories about message effects and behavior (Slater, 1999). For example, Slater (1999) integrated the transtheoretical model and theory of reasoned action with theories related to message design, including the elaboration likelihood model. Campaigns for HIV/AIDS will often combine reasoned action approaches with other theories of persuasion, including diffusion of innovations as applied to STI prevention technologies and practices (e.g., condoms, pre-exposure prophylaxis) (Pettifor et al., 2007; Noar et al., 2009). Most often, reasoned action is used to direct content, and then other theories are used to consider appeals and message characteristics (Cappella, 2006). As an example, *The Real Cost* embraced reasoned action and theories related to emotional appeals during the development and evaluation phases (Brubach et al., 2019).

1.1. Belief-based messaging

Within the reasoned action approach to social psychology, beliefs are the targets of persuasive messaging (Fishbein and Ajzen, 2010; Fishbein and Cappella, 2006). Consistent with Fishbein's (1963, 1967) expectancy-value model, belief-based messaging approaches assume that attitude formation is an automatic process that may or may not be consciously perceived by individuals (Fishbein & Ajzen, 2010). Beliefs can come from anywhere, as they are simply defined as subjective probabilities an object has certain characteristics. In short, beliefs assign characteristics to things, ideas, and behaviors (e.g. "Push-ups always hurt my arms," or "sunscreen is usually greasy.").

Beliefs are the action unit for strategic messages and other interventions. There is a consistent process to creating belief-based messaging (Yzer, 2012; Hornik and Woolf, 1999). First, the target behavior must be defined. Then, beliefs which are readily accessible from memory, known as 'salient,' must be identified. Many interventions identify salient beliefs through traditional formative research tactics, such as audience surveys or focus groups (Willoughby & Noar, 2022). A method known as belief elicitation created by Hornik and Woolf (1999) is still used in contemporary campaigns (e.g. Hornik et al., 2019; Yzer & Gilasevitch, 2019; Sangalang et al., 2019). The belief elicitation approach essentially relies on designing a cross-sectional survey which encourages participants to rate agreement with belief statements (Hornik & Woolf, 1999).

Finally, message designers must choose which beliefs are worth addressing. Designers have the option to introduce new beliefs, challenge current beliefs, or reinforce beliefs which are already positive (Yzer, 2012; Fishbein and Ajzen, 2010). Yzer (2012) recommended focusing on beliefs, and subsequent attitudes, with the strongest

relationship with behavioral intentions, followed by beliefs that are already positive.

1.2. Behavior types and attitude types

A core concept of reasoned action approaches is that beliefs form attitudes which then predict behavior. Across the entire domain of social psychology, attitudes generally refer to "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor," (Eagly & Chaiken, 1993, p. 1). However, there are an infinite number of attitudes composed of underlying beliefs that can be used to predict or change behavior. To help organize theory, scholars have drawn a distinction between two types of attitudes: instrumental and experiential. Specifically, the distinction lies here:

"Instrumental attitude derives from the *anticipated (positive or negative) consequences* of performing a behaviour; whereas experiential attitude is determined by the beliefs individuals hold about the (positive or negative) *affective states they would experience while doing a behaviour*," (La Barbera & Ajzen, 2024, p. 633, emphasis authors). This can also be thought of as a distinction between *after* and *during* a behavior."

Unfortunately, most interventions focus exclusively on instrumental attitudes or combine experiential and instrumental attitudes into one measure and thus little is known about the discriminant, predictive validity of each (La Barbera & Ajzen, 2024). The most recent study of attitude types from La Barbera and Ajzen (2024), within the context of physical activity, showed that the predictive strength of each attitude type was influenced by alignment between the instrumental and experiential attitude. When they were both positive, the need for both as predictors was less important than when they diverged.

The only meta-analysis of the effects associated with attitude types is from McEachan et al. (2016). The random-effects meta-analysis ($k = 48$, $N = 13,019$) showed that both attitude types have on average strong relationships with intentions and behavior, the effects were extremely heterogeneous in both cases ($I^2 > .85$), thus making the mean effect sizes difficult to interpret. The same analysis showed that experiential attitudes were stronger predictors overall, but with significant heterogeneity. The McEachan et al. (2016) meta-analysis only had research up to 2012, with most studies from much earlier than 2012, and thus this research area needs updated evidence.

A potential solution for deriving insight into the heterogeneous effects of attitude types on behavior is to investigate potential 'matching' relationships between types of attitudes and types of behavior. The nature of a behavior or behavior category matters a lot for determining what beliefs and attitude types, instrumental and experiential, could be most influential for encouraging behavior change. The most fundamental distinction in health communication is behaviors which mitigate health risk (i.e. sunscreen, mammography), or those that increase health risk (i.e. substance use, sun exposure). Although contemporary research on attitude types is scant (La Barbera & Ajzen, 2024), there is some evidence that health behaviors are predicted by different types of attitudes than are behaviors which increase risks. McEachan et al. (2016) showed that both types of attitudes are stronger predictors of risk behaviors than of prevention behaviors.

Lawton et al. (2009) used a city-wide survey to compare types of attitudes across nine health risk behaviors (i.e. substance use, speeding) and health promotion behaviors (i.e. flossing, sunscreen). In their study, they named the distinction 'cognitive' and 'affective' attitudes, but it is the same as instrumental and experiential (La Barbera & Ajzen, 2024). Experiential attitudes were strong predictors of health promoting behaviors and risk behaviors. Instrumental attitudes predicted all behaviors in the study except fruit and vegetable consumption, physical activity, or smoking. Interestingly, they showed that when cognitive and affective attitudes were not aligned, the relationship between affective/experiential attitude and behavior was stronger. This relationship

appeared for binge drinking, drug use and smoking. They also showed that instrumental and experiential attitudes uniquely predict intentions and behaviors across health and risk behaviors, showing discriminant validity.

1.3. The current study

Considering the complicated, inconsistent landscape of research findings, there is reason to more thoroughly investigate the distinction between instrumental and experiential attitudes. Considering the limited evidence, the primary objective of the paper was to investigate the research question below through exploratory analyses of campaign evaluation data.

RQ: Will the relative predictive strength of instrumental and experiential attitudes differ between health behaviors and risk behaviors?

A secondary objective was to utilize belief elicitation to complement the analyses of attitude measures, all in the service of identifying future messaging directions for a long-running health intervention.

2. Method

2.1. Intervention

A community college is implementing a place-based cancer prevention campaign focused on tobacco-free living and sun safety through a broader cancer prevention initiative. Be Well™ Baytown aims to mobilize the community to promote wellness and stop cancer before it starts by uniting partners to carry out community-led solutions that will make positive, long-lasting changes in people's lives (Rechis et al., 2021; Raber et al., 2025). As with the larger initiative, the work with the community college embraces the whole community, multi-component approaches to sun safety and tobacco control (Love et al., 2024a; Love et al., 2024b; Guide to Community Preventive Services, 2024). The college is a two-year, minority-serving institution on the Texas Gulf Coast with an enrollment near 9,000 students (Lee College, n.d.). They have implemented comprehensive policy changes, and embraced environmental supports, including sunscreen dispensers, sunshades, and tobacco cessation resources. Further, they have a comprehensive communication strategy which utilizes physical signage and digital promotion.

Evaluation data prior to 2024 showed largely positive scores on the importance of sun safety behaviors and high awareness of the sun safety campaign, but lower engagement in sun safety behaviors, and therefore the goal of the 2024 survey was to explore new insights for message design (Love et al., 2024a). Also, the relatively low prevalence of tobacco and nicotine use combined with high awareness of the tobacco-free policy also pushed the evaluation design to explore new messaging directions (Love et al., 2024b). Thus, the 2024 survey was updated substantially from previous years of data collection.

The main conceptual addition to the survey was to differentiate between instrumental and experiential attitudes toward sun safety and tobacco/nicotine use with an eye toward improvements in campaign effectiveness. However, other measures were added to also improve measurement consistency across reasoned action constructs.

2.2. Procedure and participants

To assess the effect of message design and the campaigns an online survey was sent to all students, staff and faculty via email through an office that provides campus support services. In March–April 2024, $N = 397$ students, staff, and faculty from the college responded. Data was collected for four weeks, starting mid-March and ending mid-April. Reminder emails were sent every four days. This research was declared exempt by the institutional IRB. All participants gave informed consent at the beginning of the survey. Participants who opted to provide contact information after completing the anonymous survey were entered into a

drawing for 15 gift cards worth \$225 USD total. See Table 1 for a description of the survey sample.

2.3. Measures

This survey had many components. More constructs were measured than are analyzed in the present study. The survey was designed based on standards for the reasoned action approach (Fishbein & Ajzen, 2010). In the current analysis, instrumental attitudes, experiential attitudes, and intentions are included for key behaviors: sunscreen use, sunscreen dispenser use, tanning, using tobacco/nicotine and for quitting tobacco/nicotine products. For each behavior, a description of the behavior being asked about was included. These descriptions were meant to minimize variance in understanding of the behavior. All participants were asked about their intention to use tobacco/nicotine products, however, only current users were asked about attitudes toward tobacco/nicotine use. All measures were on scales of 1–5.

2.3.1. Instrumental attitudes

Instrumental attitude for each behavior was assessed with one item asking participants to respond to “For me, [doing behavior] is...” on a bipolar adjective scale ranging from “useful: useless” for using tobacco/nicotine, quitting tobacco/nicotine use, applying sunscreen and using sunscreen dispensers. For tanning, the bipolar adjective scale ranged from “very harmful” to “very beneficial.” The midpoint of the scale corresponded to “neither useful nor useless” or “neither harmful nor beneficial.”

Table 1
Demographics of participants.

Demographics	Number (%) of participants $N = 397$
Campus Role	
Faculty/Staff	117 (29.5%)
Students	215 (54.2%)
Missing	65 (16.4%)
Age	
18–25 years old	136 (34.3%)
26–64 years old	186 (49.9%)
65 + years old	11 (2.8%)
Missing	64 (16.1%)
Race/Ethnicity	
African American or Black	35 (8.8%)
American Indian or Alaska Native	16 (4.0%)
Asian/Asian Indian/Asian American	15 (3.8%)
Middle Eastern/North African	4 (1.0%)
Native Hawaiian or Pacific Islander (NHOP)	3 (0.8%)
White/Caucasian	225 (56.7%)
Prefer not to say/Prefer to self-describe	46 (11.6%)
Missing	68 (17.1%)
Hispanic or Latin	
Yes	138 (34.8%)
No	195 (49.1%)
Missing	64 (16.1%)
Language	
English only	210 (52.9%)
English and Spanish	103 (25.9%)
English and Another Language	20 (5.0%)
Missing	64 (16.1%)
Gender	
Man	64 (16.1%)
Woman	263 (66.2%)
Other/Prefer not to say	4 (0.10%)
Missing	66 (16.6%)
First-Generation College Student	
Yes	165 (41.6%)
No	152 (38.3%)
Not Sure	16 (4.0%)
Missing	64 (16.1%)

Note. The categories for race and ethnicity are not mutually exclusive.

2.3.2. Experiential attitudes

Experiential attitude for each behavior was assessed with one item asking participants to respond to “For me, [doing behavior] is...” on a bipolar adjective pair of “very unpleasant” to “very pleasant.” The midpoint of the scale corresponded to “neither pleasant nor unpleasant.”

2.3.3. Behavioral intentions

Intention to engage in each behavior was assessed by asking participants to rate their agreement with the statement “I intend to...[Insert behavior].” The scale had five points ranging from “strongly disagree” to “strongly agree.”

2.3.4. Belief elicitation

There were also belief elicitation exercises for sun safety, tobacco-free/nicotine-free living and barriers to quitting use of tobacco/nicotine products. The belief elicitation measures were abbreviated versions of the Hornik and Woolf (1999) approach to identifying campaign themes, which has been validated in contemporary health promotion efforts (e.g. Hornik et al., 2019; Yzer & Gilasevitch, 2019; Sangalang et al., 2019). For sun safety behaviors, participants were asked “What are some problems or difficulties you face in practicing sun-safe behaviors, such as applying sunscreen, wearing a hat, wearing sleeves, or spending time in shade?” and “What are some reasons you want to practice sun-safe behaviors, such as applying sunscreen, wearing a hat, wearing sleeves, or spending time in shade?” Each participant was invited to list three thoughts for each question.

This study also elicited beliefs regarding tobacco/nicotine use. Non-users were asked “If you never started using tobacco/nicotine products, or successfully quit, why do you avoid using tobacco?” Current users of tobacco/nicotine products were asked “If you are trying to reduce usage of tobacco/nicotine products or quit using tobacco/nicotine products completely, what are some barriers or challenges you have faced in the process?”

2.4. Analysis plan

A series of regression analyses were used to assess the predictive relationships of instrumental and experiential attitudes on intentions to engage in a) sunscreen use, b) sunscreen dispenser use, c) tanning, d) using tobacco/nicotine products and e) quitting using tobacco free products. For each model, the intention variable was regressed onto the matching instrumental and experiential attitudes along with an interaction term. Predictors were mean centered. No missing data was imputed. The belief elicitation questions were analyzed using a text aggregation analysis offered by Qualtrics which produce figures showing the relative frequency of key terms.

3. Results

See Table 1 for a further description of the survey sample. Descriptive statistics for variables included in regression analyses are presented in Table 2.

3.1. Using types of attitudes to predict behavioral intentions

Simple regression analyses showed that instrumental and experiential attitudes had different relationships with intention among different behaviors. See Table 3 for a summary of regression analyses. Figs. 1 through 5 show the interaction, or lack thereof, between attitude types predicting intentions for each behavior.

3.1.1. Sunscreen use

Intention to use sunscreen ($M = 4.20$, $SD = .92$) was the strongest compared to other sun exposure behaviors and tobacco/nicotine use behaviors. Instrumental attitudes toward using sunscreen were also the highest compared to other behaviors ($M = 4.34$, $SD = .87$). The

Table 2

Descriptive statistics for study variables organized by model.

Model	Variable	<i>M</i>	<i>SD</i>	<i>N</i>
Intention to use sunscreen	Instrumental	4.34	.87	376
	Experiential	3.34	1.06	376
	Intention	4.20	.92	372
Intention to use campus sunscreen dispensers	Instrumental	3.77	1.14	367
	Experiential	3.44	.97	367
	Intention	3.27	1.31	362
Intention to engage in indoor or outdoor tanning	Instrumental	2.19	1.16	358
	Experiential	2.54	1.28	358
	Intention	2.12	1.38	357
Intention to use tobacco or nicotine	Instrumental	2.70	1.46	54
	Experiential	3.07	1.41	54
	Intention	1.41	1.00	344
Intention to quit using tobacco or nicotine products	Instrumental	3.76	1.27	53
	Experiential	2.66	1.34	53
	Intention	3.72	1.10	53

Note. Only participants who indicated use of a tobacco or nicotine product prior to the survey were asked about their attitudes toward using and quitting tobacco/nicotine products, and quit intentions. All participants were asked about intentions to use tobacco.

experiential attitude was less favorable ($M = 3.34$, $SD = 1.06$). In a regression analysis, both instrumental ($\beta = .60$, $\eta^2 = .25$) and experiential attitudes ($\beta = .15$, $\eta^2 = .04$) independently predicted intentions to use sunscreen and did not interact. Having more positive instrumental and experiential attitudes toward using sunscreen predicted stronger intentions but the relationship was stronger for instrumental attitudes. Additionally, the proportion of variance explained (25%) is much higher for instrumental attitudes, compared to experiential (4%), when it comes to sunscreen use.

3.1.2. Campus sunscreen dispenser use

Intentions to use the sunscreen dispensers on campus were lower ($M = 3.27$, $SD = 1.31$) than the other cancer prevention behaviors (i.e. sunscreen use, quitting tobacco/nicotine use), but higher than the intentions to engage in health risk behaviors (i.e. tanning and using tobacco/nicotine). For using sunscreen dispensers, instrumental attitudes ($M = 3.77$, $SD = 1.13$) were more positive than experiential ($M = 3.44$, $SD = .97$). Both instrumental ($\beta = .38$, $\eta^2 = .09$) and experiential attitudes ($\beta = .47$, $\eta^2 = .11$) positively predicted intention to use sunscreen dispensers on campus independently but did not interact. They both had a similar strength of relationship and accounted for a similar amount of variance, explaining 9 and 11% of differences in intention scores, respectively.

3.1.3. Engaging in tanning behavior

Participants intentions to engage in tanning behaviors which increase UV exposure ($M = 2.12$, $SD = 1.38$), including tanning beds or outdoor tanning, were lower than all the cancer prevention behaviors. Intention to engage in tanning was only higher than the intention to use tobacco/nicotine products. The experiential attitudes toward tanning ($M = 2.54$, $SD = 1.28$) was more positive than the instrumental attitude ($M = 2.19$, $SD = 1.16$). Both types of attitudes positively predicted intentions. Experiential attitude also explained a greater variance in intentions to tan ($\beta = .49$, $\eta^2 = .21$) than did instrumental attitude ($\beta = .41$, $\eta^2 = .12$). Tanning was the only behavior studied in which the types of attitudes interacted, although the effect size was quite small ($\beta = .11$, $\eta^2 = .03$), explaining 3% of variance in scores. Specifically, the relationship between instrumental attitude and intention to tan was stronger when experiential attitudes were more positive.

3.1.4. Using tobacco/nicotine products

The intention to use tobacco ($M = 1.41$, $SD = 1.00$) was the lowest compared to all other health risk or cancer prevention behaviors. Among current users, instrumental attitudes toward using tobacco/nicotine

Table 3
Regression models predicting behavioral intentions from instrumental and

Outcome Variable	Predictor	β	95% CI	SE	t	p	Signif.	η^2	N
Intention to Use Sunscreen	Instrumental	0.60	[0.49–0.71]	0.05	10.98	<.0001	***	.25	372
	Experiential	0.15	[0.07–0.23]	0.04	3.69	.0003	***	.04	
	Interaction	0.01	[-0.07–0.09]	0.04	0.23	.8194		<.01	
Intention to Use Campus Sunscreen Dispensers	Instrumental	0.38	[0.26–0.51]	0.06	6.03	<.0001	***	.09	362
	Experiential	0.47	[0.33–0.62]	0.07	6.49	<.0001	***	.11	
	Interaction	0.06	[-0.03–0.15]	0.05	1.29	.1970		<.01	
Intention to engage in indoor or outdoor tanning	Instrumental	0.41	[0.29–0.52]	0.06	6.98	<.0001	***	.12	357
	Experiential	0.49	[0.39–0.59]	0.05	9.79	<.0001	***	.21	
	Interaction	0.11	[0.05–0.18]	0.03	3.53	.0005	***	.03	
Intention to Use Tobacco or Nicotine	Instrumental	0.25	[0.04–0.47]	0.11	2.38	.0212	*	.10	54
	Experiential	0.63	[0.41–0.86]	0.11	5.62	<.0001	***	.39	
	Interaction	-0.06	[-0.19–0.07]	0.07	-0.96	.3422		.02	
Intention to quit using tobacco or nicotine products	Instrumental	0.48	[0.24–0.72]	0.12	4.05	.0002	***	.25	53
	Experiential	0.04	[-0.20–0.28]	0.12	0.34	.7342		<.01	
	Interaction	0.06	[-0.11–0.24]	0.09	0.75	.4587		.01	

Note. Estimates are unstandardized coefficients. η^2 = eta squared effect size. CI = confidence interval. Predictors were mean centered. *** $p < .001$, * $p < .05$

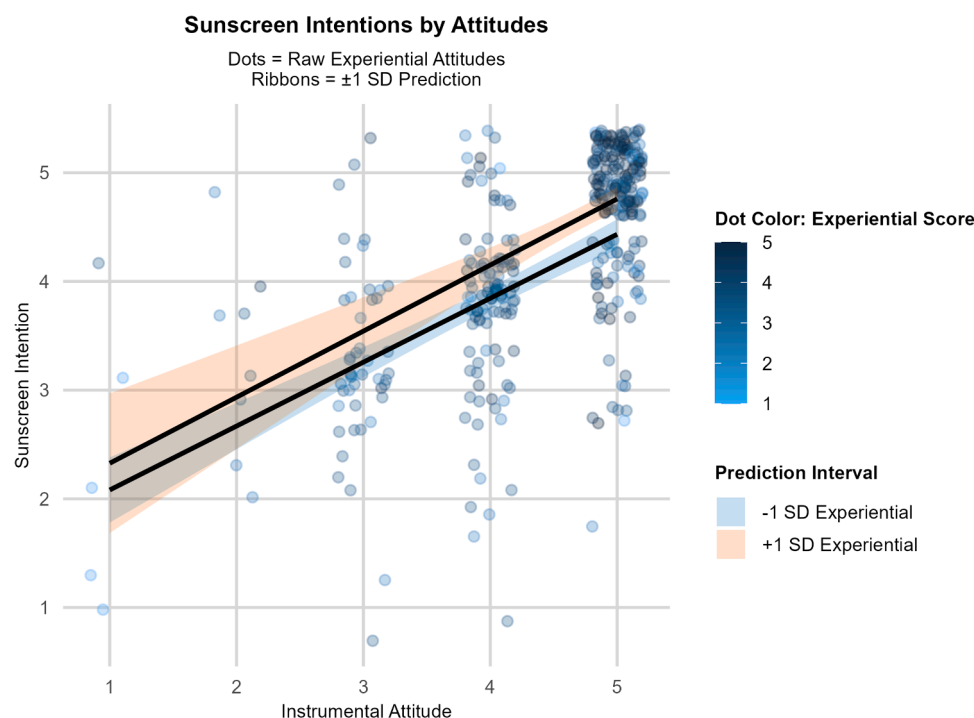


Fig. 1. Relationship between attitudes and intention to use sunscreen.

products were not positive ($M = 2.70$; $SD = 1.46$) and did not predict intentions to keep using tobacco/nicotine products. Experiential attitudes toward using tobacco/nicotine products were neither positive nor negative on average among current users ($M = 3.07$, $SD = 1.41$). Interestingly, experiential attitudes toward nicotine/tobacco use did have a strong relationship with intentions and did explain a significant amount of variance in intention scores, approximately 39%, in intention scores ($\beta = .63$, $\eta^2 = .39$). There was no interactive effect among the types of attitudes on intentions to keep using tobacco/nicotine products.

3.1.5. Intention to quit using tobacco/nicotine products

The intention to quit using tobacco/nicotine products among current users was among the strongest of behaviors studied ($M = 3.72$, $SD = 1.10$), lower than only the intention to use sunscreen. Experiential attitudes toward quitting ($M = 2.66$, $SD = 1.34$) among current users were negative. Only tanning had a lower experiential score, which was assessed with the full sample. Experiential attitudes also did not predict intentions to quit. Instrumental attitudes toward quitting ($M = 3.76$, SD

$= 1.27$) were more positive than instrumental attitudes to tan or use tobacco/nicotine products. Instrumental attitudes also predicted intentions to quit ($\beta = .48$, $\eta^2 = .25$), explaining 25% of variance in quit intention scores. There was no interactive effect among the types of attitudes on intentions to quit using tobacco/nicotine products.

3.2. Identifying beliefs related to sun safety and tobacco/nicotine behavior

A belief elicitation exercise revealed several key insights about each behavior under investigation. The results are aggregated in Fig. 6. Sunscreen was seen by participants as the most difficult sun safe behavior, followed by wearing a hat. Themes around struggling to remember sun safety behaviors and feeling busy or rushed appeared. The exercise revealed several insights regarding perceived benefits to sun safety. The most important benefits were preventing skin cancer and avoiding burns. The negative effects of sun exposure on increasing aging were also recognized by participants.

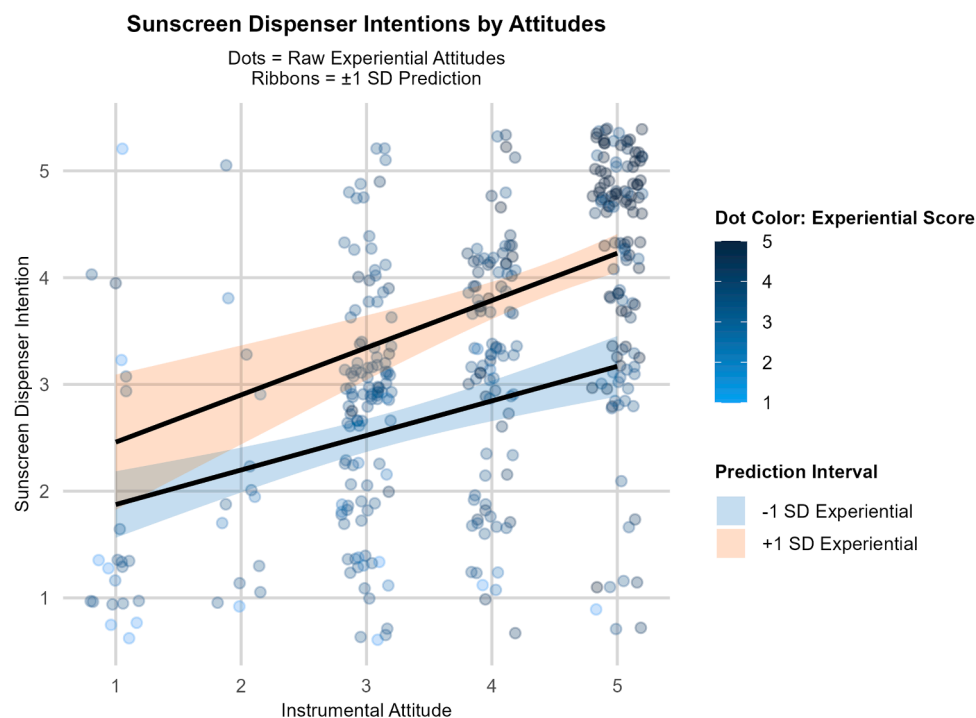


Fig. 2. Relationship between attitudes and intention to use sunscreen dispensers.

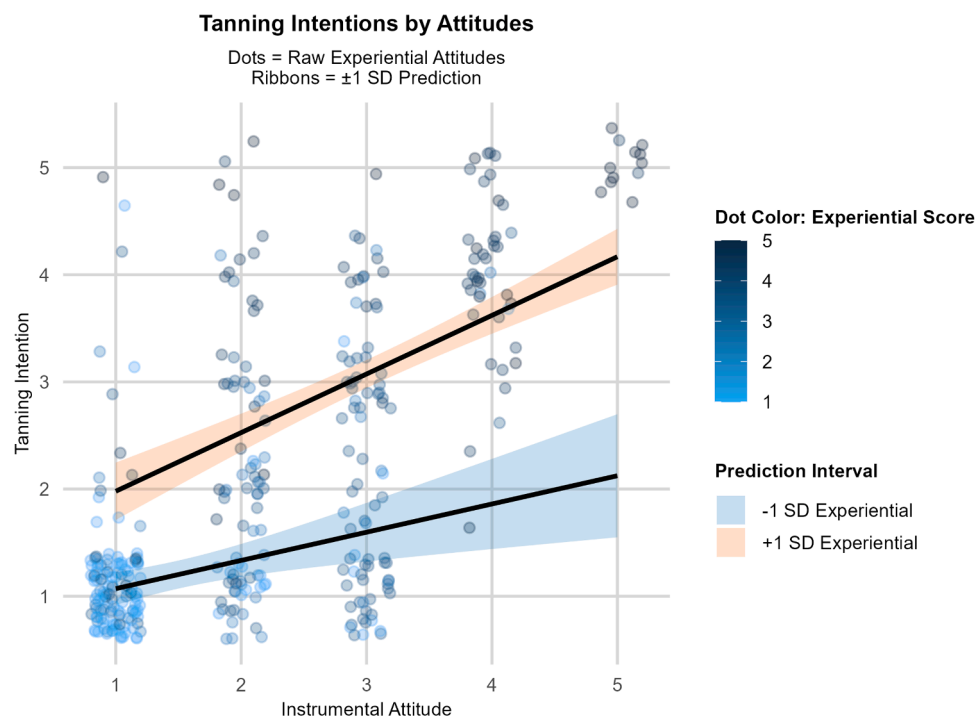


Fig. 3. Relationship between attitudes and intention to engage in tanning.

The most cited barriers to quitting the use of tobacco/nicotine products were general habit and addiction along with the negative emotional experiences associated with nicotine withdrawal: “stress,” “anxiety,” “nerves,” “craving.” Elicitation revealed several key insights about the perceived benefits of tobacco-free living. The biggest reasons to avoid using tobacco were overall health and reduced cancer risk. The smell of cigarette smoke was also a motive for tobacco-free living.

4. Discussion

Although established best practices for health intervention planning embrace iterative processes as essential (NCI, 2013), very little research has been published on how to evolve health messages over time for long-running interventions. Amidst a background of high campaign and policy awareness alongside positive outcomes (Love et al., 2024a; Love et al., 2024b), a place-based cancer prevention effort was chosen as an

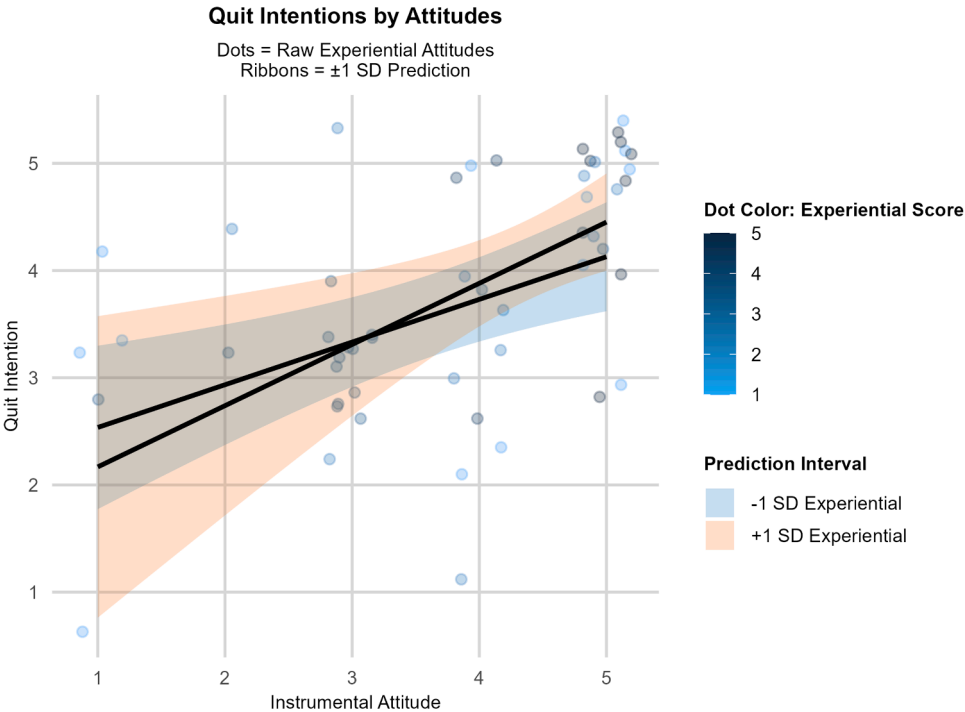


Fig. 4. Relationship between attitudes and intention to quit using tobacco/nicotine products.

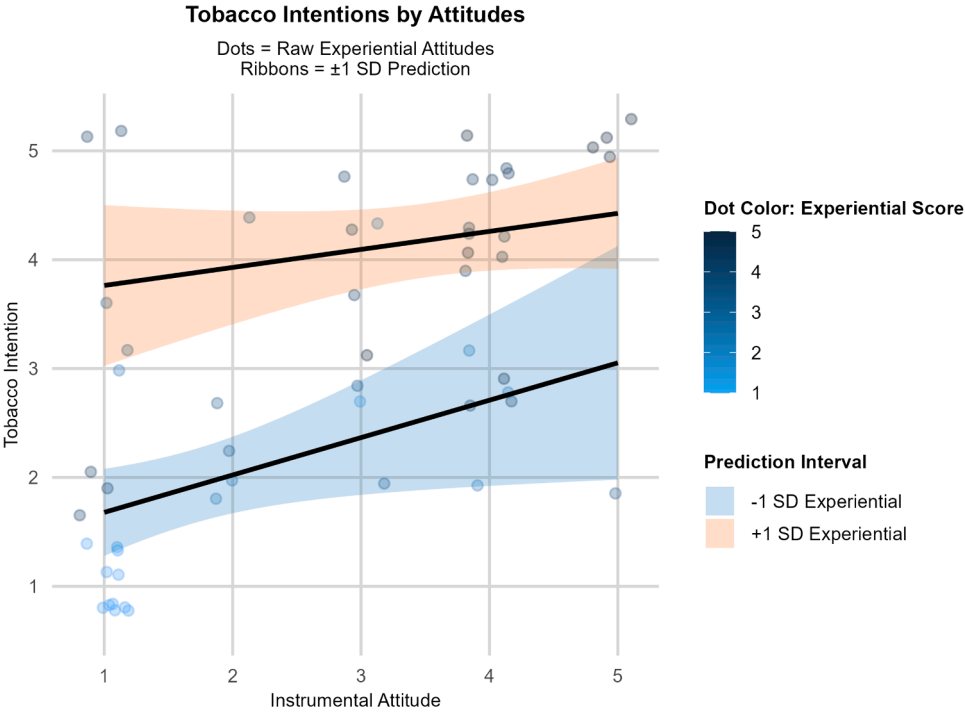


Fig. 5. Relationship between attitudes and intention to use tobacco/nicotine products.

opportunity to explore cognitive factors that could direct message content strategy.

The research team for a long-running place-based health intervention utilized the annual evaluation to explore new potential predictors of health behavior intention, specifically instrumental and experiential attitudes. Instrumental attitudes are a summary judgment based on beliefs about the consequences of a behavior, whereas experiential attitudes reflect underlying beliefs about the physical sensations and

mental states experienced while enacting a behavior (La Barbera & Ajzen, 2024). Cancer prevention behavioral intentions studied included using sunscreen, using sunscreen dispensers on campus, and quitting the use of tobacco/nicotine products. Inversely, health risk behavioral intention included in the survey were using tobacco/nicotine products and engaging in ‘tanning’ behaviors that increase UV exposure.

Encouragingly, intentions were stronger for all cancer prevention behaviors compared to cancer risk behaviors. Instrumental attitudes

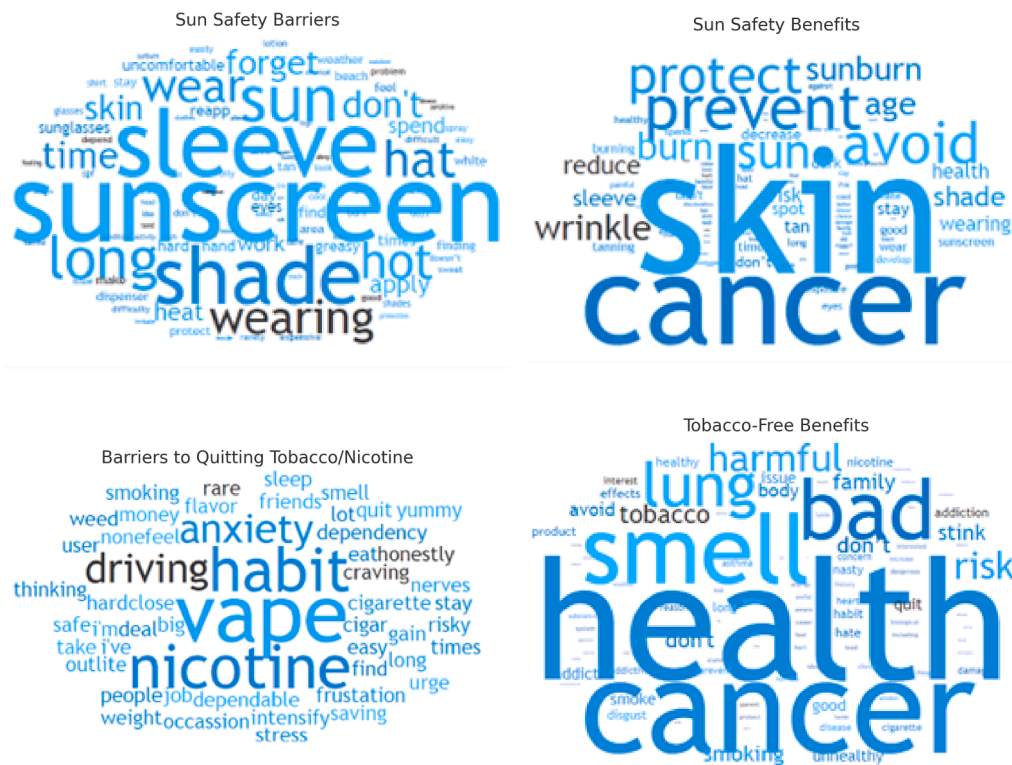


Fig. 6. Beliefs Elicited About Health Behaviors.

were more positive than experiential attitudes for using sunscreen, using sunscreen dispensers on campus, and quitting the use of tobacco/nicotine products. Inversely, experiential attitudes were more positive than instrumental attitudes for tanning and continuing to use tobacco/nicotine products. This is consistent with the limited empirical evidence and theorizing on the two attitude types (Lawton et al., 2009; Fishbein and Ajzen, 2010).

Interestingly, there were discrepancies between the attitudes that scored higher and those that predicted intention. In the case of sunscreen use, instrumental attitudes were more positive and more predictive of intention. Inversely, in the case of using dispensers, experiential attitudes were a stronger predictor of intention even though instrumental attitudes were more positive than experiential. Sunscreen emerged as a huge barrier to overall sun safety. With this discrepancy in mind, practitioners should be wary to not conflate attitude favorability with predictive strength when deciding attitude targets for messaging.

The belief elicitation exercise showed that applying sunscreen is seen by campus members as being overly difficult to do or too easy to forget, and also as a cause negative experiences related to being ‘uncomfortable,’ consistent with previous sun safety research (Abroms et al., 2003; Robinson et al., 2008; White et al., 2019).

For quitting tobacco/nicotine use, instrumental attitudes were more positive than experiential attitudes and only instrumental attitudes predicted intention to quit. Quitting not being predicted by experiential attitudes aligns with the beliefs elicited that anxiety and craving dominated thoughts about quitting. Further, the instrumental attitude being positive toward quitting aligns with elicitation data. The beliefs elicited regarding living free of nicotine/tobacco were focused on lung cancer prevention. The evidence on tobacco will require further study to achieve applied messaging insights. It could be that reinforcing favorable instrumental attitudes is the best approach. Experiential attitudes were not predictive of quitting behavior which could be due to experiential attitudes just generally not driving quitting intentions or be due to the unfavorable experiential attitude perception. It remains an open question whether attempts to shift experiential attitudes about quitting could

ultimately change their predictive strength for intention.

Tobacco/nicotine use had an experiential attitude among current users that was neither positive nor negative on average, but experiential attitudes strongly influenced intentions to keep using. Further, tobacco/nicotine use was the only behavioral intention not predicted by instrumental attitudes. Health campaigns must try to modify positive experiential attitudes to meaningfully reduce uptake of tobacco/nicotine products.

Interestingly, tanning was the only behavior in which the relationship between instrumental attitudes and intentions depended on the strength of experiential attitude. Although, the interactive effect was quite small. When experiential attitudes were higher, the relationship between instrumental attitudes and intention was stronger. Thus, the example of tanning provides an interesting case to explore behaviors in which groups vary not just on the strength or relative importance of an outcome expectation but actually expect *different* outcomes. Many health and risk behaviors share a consensus on the perceived benefits and harms, but for tanning that may not be the case. For example, some young people, especially women, tend to view tanning as a path to increase attractiveness (Geller et al., 2005; White et al., 2019), whereas other groups are less likely to feel this way. Other groups, such as those with fair skin, may have much worse outcome expectations from tanning. Those differences could also interact with the experiential attitude toward tanning.

All the results together point to a pattern that instrumental attitudes may be more predictive of cancer prevention behaviors, whereas experiential attitudes are stronger predictors of behaviors that increase cancer risk. Across many health behaviors, discrepancies exist between beliefs and behavior, which confuse message strategy for cancer prevention. The predominant focus on health outcome beliefs across the literature (McEachan et al., 2016), especially those about avoiding negative health consequences, and the relative neglect of other types of beliefs and attitudes may offer an explanation. Challenging or reinforcing experiential aspects of health and risk behaviors are relatively unexplored strategies, as are attempts at challenging or replacing both

positive instrumental beliefs about risk behavior (i.e. tanning will make me look more attractive) and negative instrumental beliefs about health behaviors (i.e. sunscreen use doesn't make a difference).

These data also present a potential explanation for why behavior prediction models that rely on cognition are weak predictors of some behaviors, particularly risky ones. The United States public, whether they use tobacco/nicotine or not, is strongly aligned in the belief that tobacco and nicotine are bad for health (Gallup, n.d.). Yet, use of these products continues, with ebbs and flows in uptake and quitting (Gallup, n.d.). Messaging strategies worth testing could include replacing the benefits of tobacco/nicotine with another product, ways of making the quitting experience more enjoyable, or emphasizing the unpleasant aspects of smoking and use, as *The Real Cost* did (Brubach et al., 2019).

4.1. Practical implications

This project was pursued to revise sun safety messaging within a place-based cancer prevention initiative. These insights were provided to program staff at the college where this campaign was first implemented. We also provided advice that future efforts should use messaging to challenge positive experiential attitudes toward tobacco/nicotine use and tanning. Furthermore, we suggested incorporating more messaging about campus resources available to make the process of quitting tobacco/nicotine easier on individuals. Further, the larger initiative which produces campaigns across many sites (Love et al., 2024c) will be incorporating these insights into future projects.

4.2. Limitations and future research

The findings from this study must be considered in the context of its limitations. The intervention studied is a place-based, hyperlocal campaign that is not representative of all health messaging nor a category of health messaging (Jackson, 1992). The multicomponent and long-running nature of the campaign make it impossible to delineate effects to specific components, a frequent problem in health campaigns evaluation (Noar, 2006). This survey was cross-sectional, thus inferential statistics are more biased than if this study utilized different time-points for predictors and outcomes. The biggest limitation is the small sample of current tobacco users. The models predicting intention to use and quit using tobacco/nicotine products should be interpreted as likely heavily biased by measurement error due to a small sample size. Furthermore, nonrandom missingness of demographic data, placed at the end of the survey, made utilizing co-variables in analyses fraught. This likely biases the relationships presented and hinders sub-group analysis. Although our survey was anonymous, some participants may have been uncomfortable disclosing tobacco/nicotine use on a survey distributed by an institution with a tobacco-free policy. Single-item measures are more prone to measurement error. Though, we tried to mitigate this by using psychometrically validated measures.

Future research should investigate these same questions using multiple interventions to see if these results are replicable and generalizable to larger groups. Further, studies should seek to assess beliefs for their susceptibility to change and then design messaging in response to see if results can be improved (Hornik et al., 2019).

5. Conclusion

Overall, the findings from this study suggest that more research into the differences in appealing to instrumental and experiential attitudes ought to be pursued. It also reinforces that the more positive attitude is not always the most predictive of behavior. It further illustrates that more attention should be directed at understanding the differences between behaviors and how they correspond to beliefs and attitudes. Overall, this study offers new directions for academic research into communication strategy.

CRedit authorship contribution statement

Brad Love: Writing – review & editing, Supervision, Methodology. **Lauren Kriss:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **Charulata Ghosh:** Writing – review & editing, Project administration, Methodology, Conceptualization. **Karly R. Quaack:** Writing – review & editing. **Rosemary Coffman:** Writing – review & editing, Supervision, Resources, Project administration, Methodology. **Katherine Oestman:** Writing – review & editing. **Mayra Aquino:** Writing – review & editing, Project administration, Methodology. **Martha Vieco-Garcia:** Writing – review & editing, Supervision, Project administration. **Haley J. Gardiner:** Writing – review & editing, Supervision. **Ruth Rechis:** Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors have no conflicts to declare.

Acknowledgments

The authors would like to thank Hayley Fick, Jessica Hughes Wagner, and Ellen Shin for their contributions to health message design at Lee College. They would also like to thank the Be Well Baytown steering committee.

Data availability

The data used in this study are available by request to the corresponding author.

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