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Targeting and tailoring message-framing: the moderating effect of racial identity on receptivity to colorectal cancer screening among African–Americans

Todd Lucas[1,2,3] · **Mark Manning**[3,4] · **Lenwood W. Hayman Jr.**[5] · **James Blessman**[1]

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Abstract This study demonstrates the potential of racial identity to moderate how gain and loss-framed messaging, as well as culturally-targeted messaging, can affect receptivity to preventive health screening. African–Americans ($N = 132$) who were noncompliant with recommended colorectal cancer (CRC) screening completed a measure of racial identity centrality—encompassing the extent to which racial identity is a core component of self-concept—and then participated in an online education module about CRC screening, during which either gain or loss-framed messaging was introduced. Half of African–Americans were also exposed to a culturally-targeted self-help message about preventing CRC. Theory of Planned Behavior measures of attitudes, normative beliefs, perceived behavioral control, and intentions to obtain a CRC screen served as outcomes. Results confirmed that effects of messaging on receptivity to CRC screening depended on racial identity. Among low racial identity African Americans, gain-framed messaging most effectively increased normative beliefs about obtaining CRC screening, whereas among high racial identity African Americans loss-framed messaging was most compelling. However, these effects most strongly emerged when culturally-targeted self-help messaging was included. We discuss implications for health disparities theory and research, including a potential to simultaneously deploy culturally-targeted and tailored messaging based on racial identity.

Keywords Message-framing · Colorectal cancer · Culturally-targeted · Tailored messaging · Illness detection · Health disparities · African–American · Theory of planned behavior · Racial identity

Introduction

Over one million individuals are diagnosed with colorectal cancer (CRC) each year, and in the United States, CRC remains the second leading cause of cancer-related death (ACS, 2017). CRC is especially burdensome for African–Americans, who have the highest CRC incidence and death rate of any ethnic group in the United States (ACS, 2016). Primary prevention and health promotion both contribute to disparities in CRC incidence and mortality. However, CRC disparity among African–Americans is largely attributable to lower and slower rates of CRC screening (ACS, 2016; CDC, 2005). Better promoting uptake of CRC screening among African–Americans is therefore critical. The current research examined how gain and loss-framed messaging, as well as culturally-targeted self-help messaging can be used to bolster African–Americans receptivity to CRC screening. Extending our previous research in this area (Lucas et al., 2016), we presently consider whether the effectiveness of these messaging approaches further depends on individual differences in racial identity.

✉ Todd Lucas
tlucas@med.wayne.edu

[1] Department of Family Medicine and Public Health Sciences, Wayne State University, 3939 Woodward Ave., Detroit, MI 48201, USA

[2] Department of Psychology, Wayne State University, 5057 Woodward Ave., Detroit, MI 48202, USA

[3] Karmanos Cancer Institute, 4100 John R - MM03CB, Detroit, MI 48201, USA

[4] Department of Oncology, Wayne State University, 4100 John R - 1D UHC, Detroit, MI 48201, USA

[5] Department of Public Health and Health Sciences, University of Michigan, 530 French Hall, Flint, MI 48502, USA

In doing so, we suggest that racial health disparities stemming from behavioral prevention might be addressed by simultaneously deploying culturally-targeted and tailored health communication.

Message-framing and culturally-targeted messaging

Message-framing strategies were originally derived from prospect theory, which describes how people make choices between alternatives that involve risk (Kahneman & Tversky, 1979). Among its insights, prospect theory highlights that risk tolerance may be influenced by presenting risk information to individuals through gain and loss framings (Kahneman, 2003). Gain-framings of risk emphasize potential benefits to be gained from taking action and motivate preferences for risk-aversion, whereas loss-framings highlight potential costs that could result from inaction and motivate risk-taking. Rothman and Salovey (1997) adopted prospect theory to suggest strategies for encouraging prevention and detection health behaviors. Prevention behaviors, such as exercise or healthy eating, typically convey certain health benefits, such that individuals may be better persuaded to perform them when gain-framed messages are used. Alternatively, and because they are psychologically risky to individuals through their potential to reveal an illness, detection (screening) behavior is better compelled by loss-framed messaging, which encourages risk-taking. Meta-analytic reviews confirm that loss-framed messaging is indeed associated with a small, but discernible overall increase in detection health behavior, including cancer screening (Gallagher & Updegraff, 2012; O'Keefe & Jensen, 2009).

Although there is some support for theoretically predicted message-framing effects (though see Van't Riet et al., 2016), evidence that loss-frames increase detection behavior among African–American is sparse (Banks et al., 1995; Lauver & Rubin, 1990; Schneider, 2006; Schneider et al., 2001). Critically important, Lucas et al. (2016) showed that loss-framed messaging carries a potential to *adversely influence* African–American screening behavior. Consistent with prior research, White Americans in this study reported greater perceived personal control over obtaining CRC screening when exposed to a loss-framed message, in which the consequences of not being screened for CRC were underscored. However, African Americans reported greater perceived personal control when exposed to a gain-framed message, in which the benefits of being screened for CRC were emphasized. The adverse effect of loss-framed messaging on African Americans' was mediated by arousal of perceived racism (see also Nicholson et al., 2008). Thus, Lucas et al. (2016) demonstrate not only the potential for a profound cultural difference in theoretically predicted message-framing effects, but also that culturally-oriented cognition and emotion can be affected by message-framing in ways that alter the effects of this messaging (for related research, Ferrer et al., 2012).

In tandem to demonstrating an overlooked cultural difference, Lucas et al. (2016) also showed that the effects of message-framing on African Americans can be altered by a simultaneous use of culturally-targeted messaging. Whereas a stand-alone (i.e., untargeted) loss-framed message increased perceived racism and reduced perceived control over CRC screening, including a culturally-targeted self-help message, in which the potential to overcome racial disparities in CRC through ensuring that one is personally screened (c.f. Neighbors et al., 1994, 2012), mitigated these effects. Moreover, pairing a culturally targeted self-help message with loss-framing promoted perceived personal control over CRC screening equal to the level achieved through use of a stand-alone gain-framed message. These additional findings resonate with a vast literature supporting the use of culturally-targeted messaging strategies (Kreuter et al., 2003; Sherman et al., 2011; Uskul & Oyserman, 2010), including to encourage preventive health behavior among African–Americans (Kreuter et al., 2004; Kreuter & Haughton, 2006). Such findings also suggest that developing culturally-targeted versions of general communication approaches may bolster effectiveness with racial minorities.

Tailored-messaging and racial identity

In the health disparities literature, momentum is increasingly shifting away from targeted intervention approaches to those that endeavor to be tailored (Kreuter et al., 2013; Rimer & Kreuter, 2006). Whereas targeted approaches are formulated based on group-level characteristics shared by all members of a population, tailored interventions attend to individual-level characteristics (Kreuter et al., 2003). A key strength of tailoring is that such approaches address within-group heterogeneity to maximize effectiveness. In doing so, tailored approaches recognize that the effects of health messages on racial minorities are not homogenous, but rather crucially depend on individual differences. In turn, tailored communication approaches require practitioners to develop multiple messages, as well as methods to selectively deploy these messages to particular individuals. Of present interest, enthusiasm for tailored health communication dovetails with recent advances in message-framing research, which has shown that message-framing effects also depend on individual differences, including self-construal, motivational orientation, and perceived susceptibility (for review, Rothman & Updegraff, 2011). Such research has also shown that cultural characteristics may moderate message-framing effects (Uskul et al.,

2009), further highlighting that individual differences may also be important in cross-cultural contexts.

Although individual differences research highlights a profound potential for tailored message-framing, evaluating *culturally-tailored* approaches, in which individual differences fundamental to racial minorities form the basis of message tailoring, has lagged (for review, Harvey & Afful, 2011). This dearth is regrettable given that culturally-tailored approaches may be vital to addressing a range of disparities that stem from health behavior, including CRC screening. Tailored messaging has also not been well evaluated alongside use of culturally-targeted messaging strategies. Advancing research in this direction seems crucial when insights provided by Lucas et al. (2016) recent study are overlaid with the tailored messaging literature. Namely, simultaneously deploying targeted and tailored communication approaches may be critical to addressing racial health disparities that stem from behavioral prevention.

One potential in-road to culturally relevant tailoring of both gain/loss and targeted messaging is racial identity. Racial identity refers to the unique experience of belonging to a specific racial group (Cross, 1971). A considerable body of research has evolved to describe the processes by which identification with one's race or ethnicity develops. For example, Phinney (1989) suggested that racial minority adolescents can be described as belonging to one of three identity development stages that include no identity exploration, active exploration, or committed racial identity. Beyond considering the developmental course of racial identity, other research has endeavored to classify the ways and extent to which individuals have ultimately identified with their race. In turn, a handful of taxonomies have been proposed for operationalizing and segmenting racial identity, including among African Americans. For example, Davis et al. (2010) have proposed that racial identity among African Americans encompasses five discrete subtypes that include Assimilated, Afrocentric, Black American, Bicultural, and Multicultural forms. A forerunner to the Davis et al. (2010) taxonomy was proposed by Sellers et al. (1997), who developed the Multidimensional Inventory of Black Identity (MIBI) to suggest that stable dimensions of racial identity among African Americans can be measured along three dimensions that include centrality, regard, and ideology. The centrality dimension of racial identity refers to the significance of race to one's sense of identity, whereas regard and ideology components describe the qualitative meaning of this identity. Of present interest, a common thread between the MIBI and other racial identity taxonomies is that racial identity among African Americans can be considered first and in part by measuring the significance of being Black to one's self concept (Sellers & Shelton, 2003). In turn, the centrality subscale of the Multidimensional Inventory of Black Identity (MIBI; Sellers et al., 1997) has emerged as an oft-used individual difference measure to indicate the general strength with which African American individuals identify with their race.

In tandem to describing the development and structure of racial identity, much attention has been given to links between racial identity and well-being among African Americans, and prior research has identified a potential for both protective and deleterious effects. For example, some research suggests that being strongly identified as a member of one's race or ethnicity can confer health benefits (Smith & Silva, 2011), which may be due to the capacity of a strong racial identity to buffer against racially-based stressors (Sellers et al., 2006). However, research has also suggested that racial identity may create stress vulnerability by increasing sensitivity to marginalization and racism (e.g., Romero & Roberts, 1998). Of present interest, we suggest that racial identity could be an important moderator of response to health messaging. In turn, the strength of one's racial identity may form the basis of a culturally-relevant tailoring approach (see also, Davis et al., 2010; Resnicow et al., 2009). This includes the potential of racial identity to guide the responses of African–Americans to both stand-alone and culturally-targeted gain/loss messages. Also similar to available literature, healthy and harmful persuasion might both result from health communication as a function of racial identity. For example, buffering effects of racial identity might be protective for strongly identified African Americans, who might respond less negatively to loss framed messages. Conversely, deleterious effects of racial identity may lead to stronger activation of racial stressors, yielding more negative responses to loss framed messages. Moreover, these effects might further depend on whether loss-framed messages are culturally-targeted.

The current research

Extending our previous research in this area (Lucas et al., 2016), the present study sought to evaluate the potential of racial identity to moderate how gain and loss-framed messaging, as well as culturally-targeted messaging, affect receptivity to engaging in CRC screening among African Americans. Our prior research demonstrates that gain as opposed to loss-framed messaging better compels perceived personal control over CRC screening among African Americans, though loss-framed messaging may be compelling if it is culturally-targeted (Lucas et al., 2016). Presently, we focus on the potential of individual differences in racial identity to further moderate this interactive messaging pattern. We focused on the individual differences in the centrality of racial identity to one's self con-

cept. Although qualitative (i.e. segmented) characterizations of racial identity may also be used to consider potential moderating effects on response to health messaging, our rationale was that focusing initially and broadly on the extent to which racial identity is close to one's core concept of self would provide a useful starting point—while many measurement structures qualitatively operationalize racial identity in unique ways, a common thread is that these structures consider strength of racial identity as a core component. Aligned with the notion that culturally-targeted messaging may resonate best with those who are highly identified members of their culture, and based on our prior findings, we predicted that culturally-targeted loss-framed messaging would more effectively encourage CRC screening among high racial-identity African Americans than among low racial identity African Americans.

Method

This study was conceptualized and performed in tandem to an alternate, cross-cultural consideration of this data (Lucas et al., 2016). Procedures for recruiting participants, implementing CRC educational modules, and experimentally manipulating messaging are therefore identical to a previous description.

Participants

One hundred and thirty-two African–Americans were recruited for the current study. Table 1 presents sample sociodemographic characteristics. All participants were recruited from Survey Sampling International (SSI); a survey research organization that maintains a diverse pool of over one million individuals from within the United States. Members of the SSI survey response panel are recruited using opt-in methods, such as email solicitation and internet banner advertisement. All members complete a demographic screener prior to enrolling, which enables researchers to select desired samples and screen out ineligible participants (for more information, see www.surveysampling.com). Participants were invited by SSI if they were 49 years or older and had never been screened for CRC. Fifty and over was chosen based on current guidelines (Levin et al., 2008), while recruiting participants who were 49 years old permitted including individuals just beginning to contemplate CRC screening. Study invitations were delivered via email to all participants. This email contained a link to the survey website, where a prescreen question confirmed that participants had never received a CRC screen (e.g., colonoscopy, fecal occult blood test, etc.). All participants received a small financial compensation from SSI in exchange for participation.

Table 1 Sample characteristics ($N = 132$)

Gender	
Male	37 (28.0)
Female	95 (72.0)
Age	
49–55	76 (57.6)
56–60	38 (28.8)
60–65	25 (18.9)
Over 65	0 (0.0)
Missing	0 (0.0)
Income	
Less than $15,000	32 (24.2)
$15,000–$24,999	25 (18.9)
$25,000–$34,999	23 (17.4)
$35,000–$49,999	22 (16.7)
$50,000–$74,999	15 (11.4)
$75,000–$99,999	9 (6.8)
$100,000 and above	4 (2.3)
Missing	2 (1.5)
Education	
Less than high school	1 (0.8)
High school/GED	48 (36.4)
Some college or trade school	50 (37.9)
College graduate	25 (18.9)
Professional/advanced degree	7 (5.3)
Missing	1 (0.8)
Medical insurance	
None	48 (36.4)
Medicare/medicaid	29 (22.0)
Private insurance	55 (41.7)

Percentages are given in parentheses and may add to more or less than 100 due to rounding

Design and procedure

This study was conducted as a 2 (*message frame: gain vs. loss*) × 2 (*personal prevention: culturally-targeted vs. none*) fully crossed between-participants experimental design. Experimental manipulations were embedded in an online module and survey that were developed for purposes of the current research. All responses were time-stamped, and on average participants took approximately 20 min to complete the entire module and survey.

The experiment was conducted in four parts. All participants began by consenting to participate and completing an initial set of demographic measures. In the second phase, all participants completed a brief education module about CRC. This module was designed both to inform participants about colon cancer etiology and risk factors, and to describe screening options and recommendations. Materials in the educational module were developed using publicly available resources provided by the Centers for

Table 2 Gain/loss framing and cultural-targeted personal prevention message manipulations

Gain-framed message	Loss-framed message	Culturally-targeted personal prevention message
Timeliness can be beneficial!	*Delay can be costly!*	*We are especially interested in your views of colorectal cancer screening as an African–American*
Colorectal screening effectively promotes a life free from cancer. By participating in recommended screenings you could remain free from cancer and easily add years to your life. Being screened also may make you feel relaxed and safe about gaining a future that is free of colorectal cancer	Colorectal screening effectively reduces loss of life from cancer. By not participating in recommended screenings, you could neglect a treatable cancer, and needlessly lose years off your life. Not being screened also may make you feel anxious and unsafe about losing a future free from colorectal cancer	Research has shown that colorectal cancer rates in the United States are highest among African–Americans. Some believe this difference is largely due to controllable factors such as personal lifestyle and behavior decisions. Of note, some research suggests that African–Americans do not take responsibility for obtaining colorectal screenings as soon or as often as members of other ethnic groups. Thus, colorectal cancer could be reduced if more African–Americans took control
"I have read that obtaining a colorectal cancer screening could mean that I will add years to my life. I understand that the next pages will assess my feelings about colorectal cancer screening"	"I have read that not obtaining a colorectal cancer screening could mean that I will lose years off my life. I understand that the next pages will assess my feelings about colorectal cancer screening"	"I have read that obtaining a colorectal cancer screening could mean that I will lose years off/add years to my life. I have also read that colorectal cancer may be affected by personal responsibility, and that the next pages will assess my feelings about colorectal cancer screening as an African–American"

Gain/loss-frames were either presented as stand-alone messages or paired with culturally-targeted personal prevention message

Disease Control and the American Cancer Society. The third phase of the survey contained the experimental manipulation of gain and loss messaging, as well as the manipulation of culturally-targeted personal prevention messaging (Table 2). All participants were randomly assigned to receive either a gain or loss-framed message, and approximately half of African–Americans received an additional and culturally-targeted personal prevention message. To ensure that messages were adequately attended to, all participants were required to check an item indicating that they had read and understood the assigned health message. In the final phase, all participants completed an identical set of outcome measures.

Measures

This study utilized a Theory of Planned Behavior (TPB) measurement framework. In addition, participants completed an initial individual difference measure of racial identity. Table 3 presents means and standard deviations, along with bivariate subscale correlations and internal consistency coefficients.

Theory of planned behavior

CRC attitudes, normative beliefs, perceived behavioral control, and intentions were measured as primary outcomes. As outlined by the TPB, behavioral attitudes, perceptions of behavioral norms and perceptions of behavioral control influence behavioral intentions, which in turn will influence target behaviors, such as CRC screening (Ajzen, 1985). Measures of TPB variables were constructed following recommended procedures (Fishbein & Ajzen, 2010) and used Likert-type items that ranged from 1 (*Strongly Agree*) to 7 (*Strongly Disagree*). Attitudes were measured using three items that included 'obtaining a CRC screen would be harmful for me' (reverse coded), 'obtaining a CRC would be good for me,' and 'obtaining a CRC screen would be worthless for me' (reverse coded). Normative beliefs were measured using four items including 'most people who are important to me think I should obtain a CRC screen,' 'it is expected of me to obtain a CRC screen,' 'I feel under social pressure to obtain a CRC screen,' and 'people who are important to me would want me to obtain a CRC screen.' Three items measuring perceived control included 'I am confident that I can obtain a CRC screen if I wanted to,' 'for me to obtain a CRC screen is easy,' and 'the decision to obtain a CRC screen is beyond my control' (reverse-coded). Intentions to be screened were measured with three items that included 'I expect to obtain a CRC screen,' 'I want to obtain a CRC screen,' and 'I intend to obtain a CRC screen.' Four separate measures were calculated by averaging the appropriate subscale items.

Racial identity

Participants also completed the eight-item centrality subscale of the Multdimensional Inventory of Black Identity

Table 3 Means, SD internal consistency coefficients, and bivariate associations (N = 132)

	Mean	SD	1	2	3	4	5
1. Attitudes	6.29	1.01	**.67**				
2. Norms	4.68	1.27	.25**	**.70**			
3. Perceived control	5.44	1.46	.18*	.06	**.69**		
4. Intentions	5.52	1.27	.53***	.44***	.23*	**.92**	
5. MIBI—centrality	4.17	1.00	.06	.16+	.02	.19*	**.63**

Cronbach's Alpha reported on diagonal in bold

$^{+}p < .10$., $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

(MIBI); a well-known and widely used measure of racial identity strength among African–Americans (Sellers et al., 1997). The centrality subscale measures the extent to which race is a core component of self-concept. A sample item is 'In general, being Black is an important part of my self-image.' Responses were collected using a Likert-type scale that ranged from 1 (*Strongly Agree*) to 7 (*Strongly Disagree*), and an overall score was calculated by averaging subscale items.

Statistical analysis

Moderated multiple regression analyses were used to examine interactions between message frames, culturally-targeted messaging, and racial identity. To facilitate interpretation, TPB subscales were mean centered prior to analysis. Racial identity scores were also mean centered, and interaction terms were created by multiplying racial identity with dummy-coded vectors for message framing (− 1 = loss-framed, 1 = gain-framed) and targeting (− 1 = stand-alone, 1 = culturally-targeted). Hierarchical multiple regressions were then performed on each of the four TPB outcomes. The main effects of racial identity and both messaging vectors were entered on the first step of each regression, while the three two-way interaction terms were entered on the second step. Our primary focus was on the hypothesized three-way interaction of racial identity with both messaging manipulations, which was entered on the third and final step. Significance was evaluated using r square change and individual regression weights. Because our sample size was moderate, we interpreted coefficients as suggestive if the significance of both r square change and the regression weight were $p < .10$. Significant interactions were then probed separately for low and high racial identity (Aiken & West, 1991). To ensure a sufficient number of participants and a stable interpretation, cases one quarter standard deviation above and below the racial identity mean were selected when probing interactions.

Prior to conducting multiple regressions, we considered the potential to include sociodemographic characteristics presented in Table 1 as covariates. Independent samples t tests revealed no gender differences in any of the four TPB measures (p's = .070–.805). Likewise, a one way Analysis of Variance (ANOVA) suggested no mean differences in TPB measures as a function of health insurance status for each of attitudes, normative beliefs and intentions (p's = .855–.970). However, perceived control was affected by insurance status (F (2, 129) = 21.041, $p < .001$). Post hoc comparisons using least significant difference (LSD) revealed that participants with no health insurance reported lower perceived personal control over obtaining CRC screening than participants with either Medicare/Medicaid or private insurance (p's < .001). Pearson correlations revealed that TPB variables were not significantly associated with age (p's = .814–.991), or education (p's = .090–.926). For income, only normative beliefs was significantly associated (r = .256, p = .003). Based on these preliminary considerations, we also evaluated normative beliefs and perceived control regression models while including insurance status and income as covariates, if an unadjusted regression model suggested a significant or potential effect of racial identity.[1]

Results

Table 4 presents multiple regression results. Notable two-way interactions between the framing and culturally targeted messaging manipulations emerged for both CRC screening attitudes and perceived control. These interactions did not involve racial identity, and a substantive consideration of is provided elsewhere (Lucas et al., 2016). Of present interest, effects of racial identity were most evident for normative beliefs. Notably, there was a trending main effect of racial identity on normative beliefs, which suggested that racial identity was positively associated with

[1] Although participants were randomly assigned, a one-way ANOVA conducted during preliminary analysis also revealed that racial identity scores significantly differed across the four experimental cells (F (3, 128) = 3.069, p = .030). To further ensure fidelity, all statistical analyses were repeated using within-cell standardized scores for racial identity. The subsequently described results were not significantly affected by this standardization. For simplicity, we report only the results without standardization.

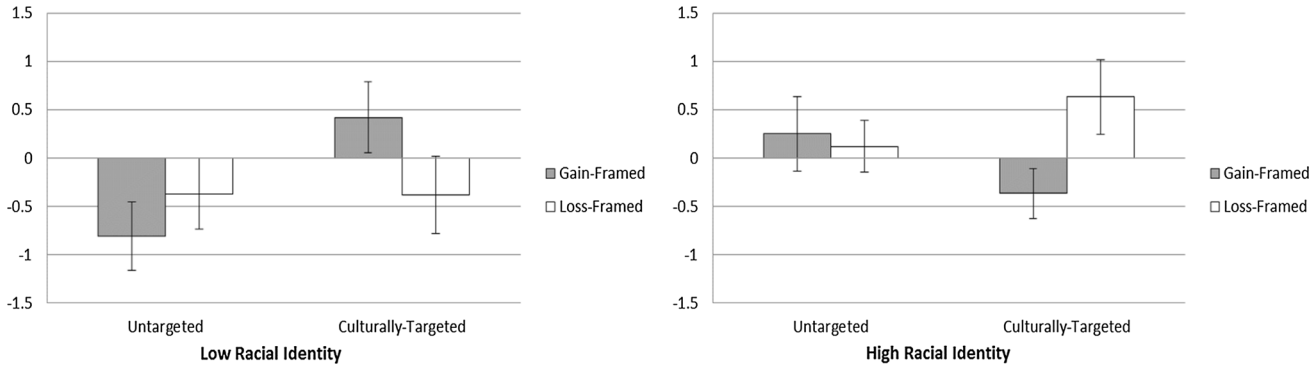

Fig. 1 Message manipulations, racial identity, and normative beliefs about colorectal cancer screening

normative beliefs about CRC screening (Δ r^2 = .024, β = .153, p = .087). A significant two-way interaction between message-framing and racial identity also emerged for normative beliefs (Δ r^2 = .048, β = − .178, p = .047), and a significant three-way interaction suggested that this interaction was further qualified by use of culturally-targeted messaging (Δ r^2 = .027, β = − .167, p = .057). As seen in Fig. 1, there were no differences in normative beliefs about CRC screening among low identity African–Americans exposed to loss-framed messaging (*stand-alone loss* M = − .37, SD = .93 vs. *targeted loss* M = − .38, SD = 1.35; d = .01). However, targeted gain-framed messaging was associated with stronger normative beliefs (*stand-alone gain* M = − .82, SD = 1.82 vs. *paired gain* M = .42, SD = .79; d = .88). Among high racial identity African–Americans, normative beliefs were stronger for the targeted loss-framed message (*stand-alone loss* M = .11, SD = 1.20 vs. *targeted loss* M = .63., SD = 1.31; d = .41), while the paired gain-framed message was associated with lower normative beliefs (*stand-alone gain* M = .25, SD = .78 vs. *targeted gain* M = − .37, SD = .99; d = .70). Including income as a covariate in the moderated multiple regression slightly attenuated both the two-way message-framing × racial identity interaction (β = − .157, p = .077), and the three-way interaction that included culturally-targeted messaging (β = − .147, p = .093), though the pattern of mean differences was not affected.

A trending main effect suggested that racial identity was also positively associated with intending to be screened for CRC (Δ r^2 = .024, β = .153, p = .087). Moreover, a trending two-way interaction with message-framing qualified this main effect (Δ r^2 = .026, β = − .147, p = .100). Among low identity African Americans, loss-framed messaging deleteriously affected CRC screening intentions (*loss* M = − .676, SD = 1.645 vs. *gain* M = − .125, SD = 1.390; d = .36), whereas among high identity African Americans loss-framed messaging enhanced screening intentions (*loss* M = .597, SD = 1.444 vs. *gain* M = .196, SD = 1.544; d = .27). Unlike normative beliefs, the two-way interaction of framing and racial identity was not further qualified by use of culturally-targeted messaging (Δ r^2 = .004, β = − .066, p = .456).

Table 4 Message manipulations and racial identity predicting receptivity to colorectal cancer screening (N = 132)

	Attitudes	Norms	Perceived control	Intentions
Step 1 Model Δ r^2	.008	.024	.027	.037
Framing	.055	.028	.086	.041
Targeted	.041	− .027	.135	.001
Racial identity	.069	.153*	.034	.195**
Step 2 Model Δ r^2	.033	.048*	.036	.026
Framing × targeted	− .167*	− .016	− .192**	.038
Framing × racial identity	− .092	− .178**	− .054	− .147*
Targeted × identity	.033	− .165	− .023	− .052
Step 3 Model Δ r^2	.008	.027*	.004	.004
Framing × targeted × racial identity	.044	− .167*	− .067	− .066

Coefficients are standardized regression weights. For framing (− 1 = loss-framed; 1 = gain-framed). For targeted (− 1 = stand-alone; 1 = culturally-targeted)

**$p \leq .05$, *$p \leq .10$

Discussion

This study suggests a potential moderating effect of racial identity on message-framing, which may further depend on the use of culturally-targeted messaging. Although gain-framed messaging resulted in stronger normative beliefs about CRC screening among African–Americans who were low in racial identity, loss-framed messaging produced stronger normative beliefs among those who were high in racial identity. Crucially, these effects were most pronounced for normative beliefs when gain/loss messaging was accompanied by a culturally-targeted self-help message about preventing CRC. That is, high racial identity revealed the theoretically predicted effect of loss-framed messaging on African Americans, especially when this message was also culturally-targeted.

Although message-framing research has identified several individual difference moderators of gain/loss messaging (Rothman & Updegraff, 2011), as well as moderating effects of culture (Uskul & Oyserman, 2010), there have been few attempts to explore moderating effects of culturally-relevant individual differences. Our findings suggest that effects of message-framing may depend on the strength with which a racial minority individual identifies as a member of his or her racial or ethnic group. Among highly-identified African–Americans, a stand-alone gain-framed message better compelled normative beliefs about CRC screening than a stand-alone loss-framed message. However, highly-identified African Americans were overall most receptive to CRC screening when a culturally-targeted loss-framed message was deployed. Thus, results suggest that for highly-identified African Americans, gain-framed messaging, as well as culturally-targeted loss-framed messaging, both may be fruitful health communication approaches. Moreover, messaging effects that are consistent with predictions of prospect theory may emerge for high racial identity African Americans when gain/loss messages are culturally-targeted. Among low identity African Americans, gain and loss-framed messaging effects were consistent with predictions derived from prospect theory when these messages were not culturally-targeted. However, culturally-targeted gain-framed messaging was overall most compelling, suggesting cultural differences in the effects of message-framing may also be evident among low identity African Americans when culturally-targeted messaging and message-framing are simultaneously deployed. Taken together, results for high and low racial identity illuminate that targeted and tailored messaging strategies both may be needed to effectively communicate about CRC screening with African Americans, who may vary considerably form one another in the extent to which racial identity is a core component of the self.

An additional contribution of this research is provided by linking racial identity to the normative beliefs component of the TPB. Some research has suggested that normative beliefs are a stronger predictor of intentions and behavior among highly-identified group members (e.g., Fielding et al., 2008). The present findings corroborate this research to the extent that we observed main and moderating effects of racial identity especially on normative beliefs. However, our results also show that effects of racial identity on normative beliefs were apparent for both high and low racial identity African Americans, depending on the use of specific messaging, suggesting that the normative beliefs channel may operate at both ends of the racial identity spectrum. One important future direction encompasses exploring how racial identity intertwines with health cognition and behavior via specific facets of the normative beliefs channel (e.g., Cialdini et al., 1990; Manning, 2009). For example, future research might consider whether racial identity more strongly intersects with descriptive norms, concerning perceptions about what others generally do (e.g., most people obtain CRC screening), versus injunctive norms, concerning perceptions about what others think should be done (e.g., most people believe obtaining CRC screening is a good thing). Future research should also specify and consider how racial identity affects general versus culture-specific normative beliefs (e.g., beliefs about CRC screening held by other Americans vs. other African Americans), which may be vital to disparities-focused applications of these health communication approaches.

Observing that racial identity affects CRC screening through the normative beliefs channel also carries potential theoretical implications within the message-framing literature. Of note, prospect theory has long suggested that affecting perceived risk underlies message-framing effects. The present findings underscore that perceived risk may be calculated not only in terms of personal health risk, but also in terms of perceived social risk, as individuals appear to consult their normative beliefs in deciding whether to partake in recommended CRC screening. We note that some judgements frameworks have more strongly emphasized social risk perception than prospect theory. For example, deviance regulation theory proposes that people regulate their beliefs and behavior more based on social consequences of deviating from usual practices than on the perceived basis of conformity (Blanton et al., 2001). In turn, accompanying research has shown that message-framing effects depend in important ways on beliefs about usual practices (Blanton et al., 2001). It is possible that the presently observed effects of message-framing and racial identity on normative beliefs similarly suggest that social rather than personal risk perception may be at the core of some message-framing effects. More generally, the current

findings may align with recent efforts to move beyond the prospect theory framework and the risk-framing hypothesis to consider how else message frames might alter preventive health behavior (Van't Riet et al., 2016).

Several limitations suggest cautious interpretation and future direction. First, this study did not measure CRC screening behavior. Future research must consider whether moderating effects of racial identity extend beyond CRC screening intentions to affect actual CRC screening behavior. Related, and due in part to a relatively modest sample size, there were many instances of only trending statistical significance, including for CRC screening intentions. In this respect, the present study should be considered preliminary and should serve as a starting point for larger and more definitive research that considers the potential moderating influence of racial identity on message-framing. This caveat holds especially for interpretation of the reported-three way interaction of message-framing with racial identity and cultural-targeting. Indeed, a more stable phenomenon may involve the two-way interaction of message-framing with racial identity, which was observed for both normative beliefs and screening intentions, such that adjunctive cultural-targeting may be less essential. A second limitation is that this research only measured one aspect of racial identity, which has been more often conceptualized as a multidimensional construct (Phinney, 1992; Sellers et al., 1997). While the centrality of race to one's own identity is often used as a singular and convenient representation of identity strength in the available literature, other aspects of racial identity may also be vital to uptake of health communication. Along these lines, the current study should be interpreted only as considering the moderating influence of racial identity strength, or more precisely, the importance of one's race to one's self concept. Future studies should assess additional aspects, including the specific qualitative meaning of a strong racial identity, which may take one of several forms and could reveal more complex segmentation strategies for developing effective culturally-tailored messaging (e.g., Davis et al., 2010; Resnicow et al., 2009). A third limitation is that the present study only included African Americans. This focus was practical given extant CRC screening disparities in the United States. Nonetheless, we cannot address whether racial identity would similarly moderate both message-framing and culturally-targeted messaging approaches in other racial groups. A fourth and related limitation, the current study only examined one approach to culturally-targeted messaging. Self-help is a health messaging approach that prior research suggests may be culturally enshrined among African Americans (Neighbors et al., 1994, 2012). However, there are numerous alternative approaches to culturally-targeted messaging, both for African Americans and other cultural groups (for review, Kreuter et al., 2003). Along these lines, one important limitation of the current study is that moderating effects of culturally-targeted messaging cannot be considered beyond the context of self-help messaging.

Limitations notwithstanding, this research provides a critical insight in suggesting that tailored health messaging may accompany the use of culturally-targeted messaging to more effectively address disparities in behavioral prevention. Among African Americans, racial identity may be a key individual difference to consider when designing and deploying health communication messages and programs, especially to the extent that individual differences in the strength of racial identity may alter the effects of general and culturally-targeted messaging approaches.

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Compliance with ethical standards

Conflict of interest Todd Lucas, Mark Manninig, Lenwood W. Hayman Jr, and James Blessman declare that they have no conflict of interest.

Human and animal rights and Informed consent 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 was obtained from all individual participants included in the study.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11–39). Berlin: Springer.

American Cancer Society. (2017). *Cancer facts & figures 2017*. GA: Atlanta.

American Cancer Society. Cancer Facts & Figures for African Americans 2016–2018 (2016). Available at: http://www.cancer.org/research/cancerfactsstatistics/cancer-facts-figures-for-african-americans 2016.

Banks, S. M., Salovey, P., Greener, S., Rothman, A. J., Moyer, A., Beauvais, J., et al. (1995). The effects of message-framing on mammography utilization. *Health Psychology, 14,* 178–184.

Blanton, H., Stuart, A. E., & Van den Eijnden, R. J. (2001). An introduction to deviance-regulation theory: The effect of behavioral norms on message framing. *Personality and Social Psychology Bulletin, 27,* 848–858.

Centers for Disease Control and Prevention. (2005). National Center for Chronic disease prevention and health promotion behavioral risk factor surveillance system: Florida 2004 colorectal cancer screening. Retrieved May 15, 2012 from http://www.cdc.gov/brfss,\

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58,* 1015–1026.

Cross, W. E. (1971). Negro-to-Black conversion experience. *Black World, 20,* 13–27.

Davis, R. E., Alexander, G., Calvi, J., Wiese, C., Greene, S., Nowak, M., et al. (2010). A new audience segmentation tool for African Americans: The Black identity classification scale. *Journal of Health Communication, 15,* 532–554.

Ferrer, R. A., Klein, W. M. P., Zajac, L. E., Land, S. R., & Ling, B. S. (2012). An affective booster moderates the effect of gain and loss-framed messages on behavioral intentions for colorectal cancer screening. *Journal of Behavioral Medicine, 35,* 452–461.

Fielding, K. S., McDonald, R., & Louis, W. R. (2008). Theory of planned behaviour, identity, and intentions to engage in environmental activism. *Journal of Environmental Psychology, 28,* 318–326.

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.

Gallagher, K. M., & Updegraff, J. A. (2012). Health message-framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine, 43,* 101–116.

Harvey, R. D., & Afful, S. E. (2011). Racial typicality, racial identity, and health behaviors: A case for culturally sensitive health interventions. *Journal of Black Psychology, 37,* 164–184.

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist, 58,* 697–720.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica, 47,* 313–327.

Kreuter, M. W., Farrell, D. W., Olevitch, L. R., & Brennan, L. K. (2013). *Tailoring health messages: Customizing communication with computer technology*. Abingdon: Routledge.

Kreuter, M. W., & Haughton, L. T. (2006). Integrating culture into health information for African–American women. *American Behavioral Scientist, 49,* 794–811.

Kreuter, M. W., Lukwago, S. N., Bucholtz, D. C., Clark, E. M., & Sanders-Thompson, V. (2003). Achieving cultural appropriateness in health promotion programs: Targeted and tailored approaches. *Health Education and Behavior, 30,* 133–146.

Kreuter, M. W., Skinner, C. S., Steger-May, K., Holt, C. L., Bucholtz, D. C., Clark, E. M., et al. (2004). Responses to behaviorally versus culturally tailored cancer communication among African–American women. *American Journal of Health Behavior, 28,* 195–207.

Lauver, D., & Rubin, M. (1990). Message-framing, dispositional optimism, and follow-up for abnormal Papanicolaou tests. *Research in Nursing & Health, 13,* 199–207.

Levin, B., Lieberman, D. A., McFarland, B., Smith, R. A., Brooks, D., Andrews, K. S., et al. (2008). Screening and surveillance for the early detection of colorectal cancer and adenomatous polyps—A joint guideline. *CA: A Cancer Journal for Clinicians, 58,* 130–160.

Lucas, T., Hayman, L. W., Blessman, J. E., Asabigi, K., & Novak, J. M. (2016). Gain versus loss-framed messaging and colorectal cancer screening among African Americans: A preliminary examination of perceived racism and culturally targeted dual messaging. *British Journal of Health Psychology, 21,* 249–267.

Manning, M. (2009). The effects of subjective norms on behaviour in the theory of planned behaviour: A meta-analysis. *British Journal of Social Psychology, 48,* 649–705.

Neighbors, H. W., Braithwaite, R. L., & Thompson, E. (1994). Health promotion and African–Americans. *American Journal of Health Promotion, 9,* 281–287.

Neighbors, H. W., Hudson, D. L., & Bullard, K. M. (2012). The challenge of understanding the mental health of African–Americans: The risks and rewards of segregation, support, and John Henryism. In E. C. Chang & C. A. Downey (Eds.), *Handbook of race and development in mental health*. New York, NY: Springer.

Nicholson, R. A., Kreuter, M. W., Lapka, C., Wellborn, R., Clark, E. M., Sanders-Thompson, V., et al. (2008). Unintended effects of emphasizing disparities in cancer communication to African–Americans. *Cancer Epidemiology, Biomarkers and Prevention, 17,* 2946–2953.

O'Keefe, D. J., & Jensen, J. D. (2009). The relative persuasiveness of gain framed and loss-framed messages for encouraging disease detection behaviors. *Journal of Communication, 59,* 296–316.

Phinney, J. S. (1989). Stages of ethnic identity development in minority group adolescents. *The Journal of Early Adolescence, 9,* 34–49.

Phinney, J. S. (1992). The multigroup ethnic identity measure: A new scale for use with diverse groups. *Journal of Adolescent Research, 7,* 156–176.

Resnicow, K., Davis, R., Zhang, N., Strecher, V., Tolsma, D., Calvi, J., et al. (2009). Tailoring a fruit and vegetable intervention on ethnic identity: Results of a randomized study. *Health Psychology, 28,* 394.

Rimer, B. K., & Kreuter, M. W. (2006). Advancing tailored health communication: A persuasion and message effects perspective. *Journal of Communication, 56,* s184–s201.

Romero, A. J., & Roberts, R. E. (1998). Perceptions of discrimination and ethnocultural variables in a diverse group of adolescents. *Journal of Adolescence, 21,* 641–656.

Rothman, A. J., & Salovey, P. (1997). Shaping perceptions to motivate healthy behavior: The role of message-framing. *Psychological Bulletin, 121,* 3–19.

Rothman, A. J., & Updegraff, J. A. (2011). Specifying when and how gain- and loss-framed messages motivate healthy behavior: An integrated approach. In G. Keren (Ed.), *Perspectives on Framing* (pp. 257–277). London: Psychology Press/Taylor & Francis.

Schneider, T. R. (2006). Getting the biggest bang for your health education buck: Message-framing and reducing health disparities. *American Behavioral Scientist, 49,* 812–822.

Schneider, T. R., Salovey, P., Apanovitch, A. M., Pizarro, J., McCarthy, D., Zullo, J., et al. (2001). The effects of message-framing and ethnic targeting on mammography use among low-income women. *Health Psychology, 20,* 256–266.

Sellers, R. M., Copeland-Linder, N., Martin, P. P., & Lewis, R. L. (2006). Racial identity matters: The relationship between racial discrimination and psychological functioning in African–American adolescents. *Journal of Research on Adolescence, 16,* 187–216.

Sellers, R. M., Rowley, S., Chavous, T. M., Shelton, J. N., & Smith, M. A. (1997). The multidimensional inventory of Black identity: Construct validity and reliability. *Journal of Personality and Social Psychology, 73,* 805–815.

Sellers, R. M., & Shelton, J. N. (2003). The role of racial identity in perceived racial discrimination. *Journal of Personality and Social Psychology, 84,* 1079–1092.

Sherman, D. K., Uskul, A. K., & Updegraff, J. A. (2011). The role of the self in responses to health communications: A cultural perspective. *Self and Identity, 10,* 284–294.

Smith, T. B., & Silva, L. (2011). Racial identity and personal well-being of people of color: A meta analysis. *Journal of Counseling Psychology, 58,* 42–60.

Uskul, A. K., & Oyserman, D. (2010). When message-frame fits salient cultural-frame, messages feel more persuasive. *Psychology and Health, 25,* 321–337.

Uskul, A. K., Sherman, D., & Fitzgibbon, J. (2009). The cultural congruency effect: Culture, regulatory focus, and the effectiveness of gain- versus loss-framed health messages. *Journal of Experimental Social Psychology, 45,* 535–541.

Van't Riet, J., Cox, A. D., Cox, D., Zimet, G. D., De Bruijn, G. J., Van den Putte, B., et al. (2016). Does perceived risk influence the effects of message framing? Revisiting the link between prospect theory and message framing. *Health Psychology Review, 10,* 447–459.