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How Thinking about the Future Affects Our Decisions in the Present: Effects of Time Orientation and Episodic Future Thinking on Responses to Health Warning Messages

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Past research has consistently shown that people have the tendency to discount future outcomes. However, most health messages emphasize the long-term consequences of behaviors. Building upon past research on temporal discounting, time orientation, and construal level, the current research examines how dispositional time orientation (present and future) predicts health behavior intentions and the impact of situationally-activated future orientation through episodic future thinking on the persuasiveness of long-term health warnings. An online experiment was conducted with 946 African American smokers randomly assigned to engage in either future thinking or present thinking prior to viewing a series of graphic cigarette warning labels. Results suggested that a stronger present time orientation predicts greater intentions to smoke, while a stronger future time orientation predicts greater intentions to quit smoking. Additionally, future (vs. present) thinking significantly increased intentions to quit smoking through enhanced perceived self-efficacy for quitting smoking. Theoretical and practical implications of the findings are discussed.

Keywords: Time Orientation, Temporal Discounting, Construal Level, Episodic Future Thinking, Cigarette Warning Labels, Smoking.

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Health warning messages oftentimes depict the long-term consequences of healthy or unhealthy behaviors. For instance, a message promoting healthy eating argues how a healthy diet reduces one's chance of developing chronic diseases. As another example, an anti-smoking message seeks to encourage quitting by showing graphic, diseased lungs. Such messages are certainly consistent with the defining characteristic of most preventive health behaviors: that they involve some short-term costs (e.g., efforts, inconvenience, forgoing of immediate pleasure), but their health benefits may only be seen years later. However, research has firmly established that people have

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the tendency to discount future outcomes relative to immediate ones, named temporal discounting (Chapman, 1998; Loewenstein & Elster, 1992; Loewenstein & Thaler, 1989). In other words, future outcomes are not seen to be as important as those occurring immediately and, as such, many health warning messages may be missing the mark by only emphasizing long-term behavioral outcomes.

Although temporal discounting appears to be a universal tendency, research has shown that individuals differ systematically in time orientation: “a stable individual difference in the extent to which people consider distant versus immediate consequences of potential behaviors” (Strathman, Gleicher, Boninger, & Edwards, 1994, p. 742). People who are present-oriented (vs. future-oriented) are dominated by considerations of immediate behavioral outcomes and, as a result, are less likely to engage in preventive health behaviors, such as sunscreen use (Orbell & Kyriakaki, 2008); are more likely to use tobacco and alcohol (Strathman et al., 1994); and respond less favorably to long-term health warning messages (Orbell & Hagger, 2006).

In the current research, we asked whether we could improve the effectiveness of long-term health warning messages by boosting people’s future orientation through episodic future thinking (EFT): that is, imagining events that will happen in the distant future, prior to message exposure. Given growing evidence that time orientation plays an important role in health decision-making, activating future orientation prior to message exposure holds strong promise for unlocking a useful intervention to improve message effectiveness. In the current research, we studied African American smokers and their responses to graphic cigarette warning labels that depicted the long-term health impacts of smoking. African American smokers are of particular interest, because they are disproportionately burdened by the adverse health impacts of smoking (National Cancer Institute, 2013). Although African Americans smoke cigarettes at the same rate as White Americans, they are more likely to develop and die from preventable diseases, such as lung cancer, due to smoking (National Cancer Institute, 2013).

Drawing upon previous research on temporal discounting (e.g., Chapman, 1998, 2005; Loewenstein & Elster, 1992), time orientation (e.g., Strathman et al., 1994), and construal level theory (Trope & Liberman, 2003), we developed hypotheses to examine how EFT might be harnessed to improve the effectiveness of long-term health warning messages.

Conceptual background

Temporal discounting

People attach less value to delayed outcomes relative to comparable, immediate outcomes: a phenomenon known as temporal discounting or delay discounting (Chapman, 1998; Loewenstein & Elster, 1992; Loewenstein & Thaler, 1989). A concept that originated in the field of economics, temporal discounting is often documented through a preference for a smaller, immediate reward over a larger,

delayed one (Bickel, Koffarnus, Moody, & Wilson, 2014; Critchfield & Kollins, 2001). The percentage of loss in value for each unit of delay is termed the discounting rate (see Chapman, 2005). Individual differences exist in terms of discounting rates, such that people with “steep” discounting rates devalue future rewards more quickly than those with “shallow” discounting rates (Levy, Micco, Putt, & Armstrong, 2006). Individual differences in discounting rates are captured under the term “time preference” (Chapman, 2005), which is often gauged by scenario-based measures, where individuals indicate their preferences between immediate and delayed options. Within individuals, their discounting rate could change, depending on a variety of situations, such as the magnitude of the outcome: for example, the discounting rate for \$100 will be a lot steeper than that for \$1,000 (see Chapman, 1996).

Temporal discounting is theoretically related to impulsivity and self-control: two concepts that are of particular importance for health, and especially for addictive behaviors (Green & Myerson, 1996). There is strong evidence supporting a relationship between temporal discounting and addictive behaviors, such as opioid dependency, cigarette smoking, and alcohol and cocaine use (Bickel et al., 2014; Chapman, 2005; Green & Myerson, 2004). According to a recent, systematic review (Barlow, McKee, Reeves, Galea, & Stuckler, 2017), smokers discount the future to a larger degree (i.e., have a higher discounting rate) than nonsmokers; smokers with lower discounting rates achieve higher quitting rates; and higher discounting rates predict the likelihood of future smoking.

Time orientation

Concepts similar to temporal discounting have also emerged in psychology and other fields, describing individual differences in time orientation, including time perspective and consideration of future consequences. Time perspective refers to one’s consideration of past, present, and future events (Zimbardo & Boyd, 1999). The Zimbardo Time Perspective Inventory has been widely used to measure an individual’s time perspective along five dimensions: past negative, past positive, present hedonist, present fatalist, and future (Zimbardo & Boyd, 1999). An example item that measures future time perspective is “I believe that a person’s day should be planned ahead each morning.” Consideration of future consequences (CFC) is defined as “a stable individual difference in the extent to which people consider distant versus immediate consequences of potential behaviors” (Strathman et al., 1994, p. 742). Individuals who are present-minded tend to focus on immediate, short-term outcomes in their decision-making, often neglecting long-term consequences. In comparison, those who are future-minded primarily consider distant, long-term consequences when choosing a course of action, while discounting short-term outcomes. Strathman et al.’s (1994) 14-item CFC scale is commonly used to measure this tendency. An example item is, “I consider how things might be in the future, and try to influence those things with my day to day behavior.”

Time orientation, as studied in the forms of time perspective and CFC, has been shown to predict a variety of health behaviors. In general, people who are future-oriented are more likely to perform behaviors that enhance their long-term health, such as physical activity, wearing a seat belt, adherence to physician advice, and mammography uptake (Adams & Nettle, 2009; Daugherty & Brase, 2010; Lukwago et al., 2003; Sweeney & Culcea, 2017; Van Der Pol, Hennessy, & Manns, 2017). Those who are present-oriented are more likely to engage in unhealthy behaviors, such as tobacco smoking and alcohol and drug use, and are less likely to quit smoking (Adams, 2009; Apostolidis, Fieulaine, Simonin, & Rolland, 2006; Hall et al., 2012; Keough, Zimbardo, & Boyd, 1999).

Time orientation not only influences health behaviors, but also how people process and respond to health messages (Kees, 2010; O'Connor, Warttig, Conner, & Lawton, 2009; Orbell & Hagger, 2006; Orbell & Kyriakaki, 2008; Orbell, Perugini, & Rakow, 2004). Consistent with the notion that time orientation is associated with the emphasis people put on present versus future outcomes, future-minded individuals are more persuaded by health messages that describe a health behavior as having long-term benefits but short-term costs, compared to ones that present short-term benefits and long-term costs; the reverse is true for present-minded individuals (Orbell & Hagger, 2006; Orbell & Kyriakaki, 2008; Orbell et al., 2004). The temporal fit hypothesis is also supported when no long-term and short-term trade-off is presented in the messages (Kees, 2010; Zhao, Nan, Iles, & Yang, 2015). For instance, in Kees (2010), the test health messages only mentioned short-term or long-term consequences of health-relevant behavior; no inherent short-term and long-term trade-off was implied.

The dynamics of time orientation

As indicated by the above review, time orientation is typically conceptualized and has often been studied as a relatively stable, dispositional characteristic. Yet, approaching time orientation as a personal trait limits our ability to test the causal impact of this characteristic on subsequent behaviors or message responses, since time orientation has to be measured by a scale. Additionally, it limits our ability to assess the possibility of changing behavioral outcomes or enhancing message persuasiveness through strategic activation of future (vs. present) time orientation. The latter is particularly salient for strategic health communication or health promotion in general, since a future orientation has been consistently linked to greater acceptance of long-term health warnings and the adoption of adaptive health behaviors.

Can a future orientation or present orientation be temporarily activated? To what extent is time orientation susceptible to the influence of situational cues or self-generated thoughts? Indeed, studies have demonstrated the surprising effects of situational cues and self-generated thoughts on activating mental processes associated with seemingly stable, dispositional characteristics (Aaker & Lee, 2001; Zhao &

Pechmann, 2007). A great example is previous work on regulatory focus, which argues that individuals systematically differ in their concerns about positive versus negative outcomes (Higgins, 1997). Individuals who are promotion-focused are concerned with the “presence and absence of positive outcomes, with advancement, aspirations, and accomplishments,” whereas those who are prevention-focused are concerned with the “presence and absence of negative outcomes, with protection, safety, and responsibilities” (Higgins, 2002, p. 178). Numerous studies have successfully induced a promotion or a prevention focus through various priming procedures (Freitas, Liberman, & Higgins, 2002; Lockwood, Jordan, & Kunda, 2002; Wang & Lee, 2006). Typically, such procedures ask participants to think about their duties, obligations, and responsibilities (to activate a prevention focus) and their hopes, aspirations, and dreams (to activate a promotion focus; e.g., Pham & Avnet, 2004). Situationally-induced prevention and promotion foci were found to have predictable effects on information processing and subsequent behaviors (Pham & Avnet, 2004; Zhao & Pechmann, 2007).

Few studies have examined the possibility of influencing time orientation through situational cues or self-generated thoughts. Of particular relevance to the current study is the concept of EFT, defined by Atance and O'Neill (2001, p. 533) as “a projection of the self into the future to pre-experience an event.” Recent studies showed the promise of EFT for inducing a future orientation, with a downstream impact on behavior (e.g., Dassen, Jansen, Nederkoorn, & Houben, 2016; Stein et al., 2016). For example, Stein et al. (2016) tested the effect of EFT on discounting rates and cigarette self-administration among smokers. For smokers who were required to vividly imagine positive, future, autobiographical events and then presented with cues reminding them of these events during the discounting task, the delay discounting rate decreased significantly, and cigarette self-administration was also reduced compared to smokers in the episodic recent thinking (i.e., mentally imagining real events that occurred the previous day) group. Similarly, in Dassen et al. (2016), EFT was found to lead to reduced discounting rates and healthier eating (less caloric intake). Using reminders of future outlook (e.g., prospective imagery or a scrambled sentence with prospect concepts in it), Cheng, Shein, and Chiou (2012) induced future-mindedness among participants, which then led to reduced delay discounting (i.e., a preference for a smaller, immediate over a larger, delayed reward) and lower desires for hedonic activities. All three studies offer preliminary evidence for the impact of situational cues or self-generated thoughts on the activation of a particular time orientation.

Situationally activating a certain time orientation may be seen as the result of a well-established psychological process: priming, which “is an experimental framework in which the processing of an initially encountered stimulus is shown to influence a response to a subsequently encountered stimulus” (Janiszewski & Wyer, 2014, p. 97). EFT temporarily activates concepts related to the future, and makes it more likely for such concepts to influence responses to subsequently-encountered stimuli

(e.g., long-term health messages), which may be considered a case of priming. As the vast literature on priming demonstrates (Wyer, 2008), the influence of activated concepts on subsequent responses often occurs without conscious awareness and, therefore, may be particularly powerful.

Hypotheses

Our review of the literature so far suggests that time orientation as an individual trait systematically predicts health behaviors. A present time orientation is expected to be associated with the performance of unhealthy behaviors, whereas a future time orientation is expected to be associated with the adoption of healthy behaviors. Consistent with the notion that time orientation consists of two distinct dimensions—a present-oriented dimension and a future-oriented dimension (Arnocky, Milfont, & Nicol, 2014; Joireman, Shaffer, Balliet, & Strathman, 2012; Zimbardo & Boyd, 1999)—the following hypotheses are proposed:

H1: A stronger present time orientation will be associated with (a) increased intentions to smoke and (b) decreased intentions to quit after viewing graphic cigarette warning labels.

H2: A stronger future time orientation will be associated with (a) decreased intentions to smoke and (b) increased intentions to quit after viewing graphic cigarette warning labels.

Moreover, based on recent work on EFT, we predict that thinking about the future (vs. present) prior to seeing long-term health warnings will temporarily activate a future (vs. present) time orientation, which then will predict a decreased likelihood of performing unhealthy behaviors and an increased likelihood of adopting healthy behaviors. The following hypothesis is proposed:

H3: Thinking about the future (vs. present) prior to seeing graphic cigarette warning labels will (a) decrease intentions to smoke and (b) increase intentions to quit.

If thinking about the future (vs. present) prior to seeing graphic cigarette warning labels is expected to decrease intentions to smoke and increase intentions to quit, it then appears important to examine the psychological processes underlying these influences. We are particularly interested in exploring the psychological process underlying the influence of future (vs. present) thinking on intentions to quit, as previous research hints at enhanced perceived self-efficacy as an explanation. Perceived self-efficacy is a central concept in a number of behavior change theories, such as the health belief model (Janz, Champion, & Strecher, 2002), the social cognitive theory (Bandura, 1977), and the transtheoretical model (Prochaska, Redding, & Evers, 2002). It refers to people's beliefs in their capacity to enact a healthy behavior or terminate an unhealthy behavior. Greater perceived self-efficacy is expected to predict a greater likelihood of a behavior change.

How might a change in time orientation affect perceived self-efficacy for quitting smoking? In the case of terminating an unhealthy behavior like smoking, one may argue that beliefs in one's capacity to enact such a behavior largely coincide with beliefs in one's ability to engage in self-control, or resisting the temptation to smoke. Exerting self-control means individuals monitor their actions consciously and prevent automatic behaviors from being executed (Fujita, Trope, Liberman, & Levin-Sagi, 2006). Self-control also requires individuals to act in accordance with long-term, rather than short-term, outcomes (Thaler, 1991; Trope & Fishbach, 2000). Activating a future (vs. present) time orientation, then, will likely improve individuals' ability to engage in self-control and possibly enhance their beliefs in that ability, as well. In a series of studies, Fujita et al. (2006) demonstrated that thinking at high versus low construal levels (e.g., thinking about why vs. how one engages in a specific behavior) significantly improved one's ability to engage in self-control (e.g., improved the ability to engage in delayed gratification, physical endurance, etc.). According to construal level theory (Trope & Liberman, 2003), thinking about the future activates high-level construals (i.e., abstract, schematic, decontextualized thoughts), while thinking about the present activates low-level construals (i.e., concrete, detailed, contextualized thoughts).

There is growing evidence that time orientation is intricately linked to self-control or self-efficacy (Joireman, Balliet, Sprott, Spangenberg, & Schultz, 2008; Wills, Sandy, & Yaeger, 2001). In the context of examining predictors of body mass index, Price, Higgs, and Lee (2017) found that higher future time perspective scores were associated with higher self-control, as measured by an inventory of general questions about the ability to resist temptation, break habits, and so forth. Price et al. (2017) further suggested that self-control likely served as a mediator between future time perspective and body mass index. In another study, Kim, Hong, Lee, and Hyun (2017) showed that a future orientation was associated with greater self-control, which then predicted less procrastination and Internet addiction. In almost all current studies demonstrating a link between time orientation and self-control, the data were correlational. In other words, there is no direct evidence that time orientation causally leads to changes in perceived self-control. The current study is an attempt to address this gap, in the context of high-risk individuals' responses to health warning messages.

Based on the above discussion, we might argue that future (vs. present) thinking should, in general, lead to improved self-control, leading to increased perceived self-efficacy for terminating an unhealthy behavior. Increased perceived self-efficacy is then expected to increase intentions to terminate the unhealthy behavior.

H4. Thinking about the future (vs. present) prior to seeing graphic cigarette warning labels will increase perceived self-efficacy for quitting smoking.

H5. Thinking about the future (vs. present) prior to seeing graphic cigarette warning labels will have an indirect effect on quitting intentions, through perceived self-efficacy.

Method

Study design and participants

We conducted an online experiment in which participants viewed three Food and Drug Administration–approved graphic cigarette warning labels. Prior to seeing the labels, participants were instructed to engage in either future thinking or present thinking (see below) with random assignment ($n = 467$ in the present condition; $n = 479$ in the future condition). After viewing the labels, participants reported their smoking intentions, quitting intentions, and perceived self-efficacy for quitting, and responded to a scale designed to measure their dispositional time orientation. We recruited eligible participants (18 or older; self-identified as African American; and current smokers: i.e., smoked every day or on some days) through Qualtrics' online panels. Qualtrics sent email invitations to potential respondents and incentivized their participation by various rewards, such as cash, airline miles, gift cards, redeemable points, sweepstakes entrance, and vouchers. Study protocols were approved by an Institutional Review Board.

A total of 946 eligible participants with diverse backgrounds completed the online survey (sex: 63.3% female; education: 1.3% less than high school, 5.5% some high school, 23.2% high school graduate, 34.8% some college, 28.3% college graduate, 6.9% post-college; annual household income: 18.5% less than \$15,000, 18.7% \$15,000–25,000, 22.3% \$25,001–45,000, 11.1% \$45,001–65,000, 13.5% \$65,001–100,000, 13.5% more than \$100,000, 2.3% did not report income level).

Future versus present thinking manipulation

Participants in the future-thinking condition were instructed to take a moment to think about the future and what their life would be like in 10 years. They were asked to write down their thoughts in a provided text box. Participants in the present-thinking condition were instructed to take a moment to think about today and what their life would be like during the rest of the day. They were asked to write down their thoughts in a provided text box. Similar manipulations were used in past research (Dassen et al., 2016; Stein et al., 2016). On average, participants spent about 226 seconds (3.76 minutes) on this task. The median time spent on the task was 100 seconds (1.67 minutes).

Message stimuli

In 2011, the Food and Drug Administration unveiled nine graphic cigarette warning images deemed effective for deterring smoking based on public comments, scientific literature, and the results of a large-scale empirical study (U.S. Food and Drug Administration, 2011). Eight of the nine images presented a mixture of illustrations and photos depicting the negative health consequences of smoking. These images would be paired with text warnings, such as “Cigarettes cause fatal lung disease” and “Cigarettes cause cancer,” to form complete warning labels to be placed on cigarette packages. We randomly selected three of these warning labels in our study (see Appendix 1). Each participant viewed all three warning labels, presented

in a random order across participants to minimize order effects. On average, participants spent about 21 seconds viewing each label.

Measures

Intentions to smoke

Intentions to smoke were measured by three items: (1) how likely would you be to smoke a cigarette during the rest of today? (2) how likely would you be to smoke a cigarette during the rest of this week? and (3) how likely would you be to smoke a cigarette during the rest of this month? Responses were indicated on a scale of 1 (extremely unlikely) to 7 (extremely likely). The items were averaged to form an index for intentions to smoke ($M = 5.42$, $SD = 1.68$, $\alpha = .90$).

Intentions to quit smoking

We probed participants' intentions to quit smoking by asking, "when do you think you might quit smoking?" The response categories were (1) no intention to quit (14.7%); (2) within the next year (28.3%); (3) within the next 6 months (27.2%); and (4) within the next 30 days (29.8%). The responses were coded such that higher scores indicated a shorter timeline to quit: a proxy for stronger intentions to quit.

Self-efficacy

Self-efficacy for quitting smoking was measured by three items: (1) I am confident that I could stop smoking within 30 days if I wanted to; (2) I am confident that I could stop smoking within six months if I wanted to; and (3) I am confident that I could stop smoking within a year if I wanted to. Responses were indicated on a scale of 1 (strongly disagree) to 7 (strongly agree). The items were averaged to form an index for self-efficacy ($M = 5.36$, $SD = 1.48$, $\alpha = .87$).

Time orientation

We used an adapted scale from the Zimbardo Time Perspective Inventory (Zimbardo, Keough, & Boyd, 1997) to measure time orientation. The scale consists of 17 items, with nine items measuring future time orientation and eight items measuring present time orientation. Sample questions included: "I believe that a person's day should be planned ahead each morning" (future); "thinking about the future is pleasant to me" (future); "I do things impulsively, making decisions on the spur of the moment" (present); and "I believe that getting together with friends to party is one of life's important pleasures" (present). Responses were indicated on a scale of 1 (strongly disagree) to 5 (strongly agree). The 17 items were subjected to a principal component analysis, which yielded two clear factors with an eigenvalue higher than 1. The items were averaged to form an index for future time orientation ($M = 3.85$, $SD = 0.63$, $\alpha = .82$) and present time orientation ($M = 2.91$, $SD = 0.87$, $\alpha = .84$). Consistent with the view that future time orientation and present time orientation are independent constructs, the two dispositions were found to be minimally correlated ($r = .194$, $p < .001$).

In addition, a confirmatory factor analysis was conducted on time orientation using the R package lavaan. We wanted to check whether this dataset yielded the intended structures for the two dimensions of time orientation. The confirmatory factor analysis was run with the nine future items loaded on the factor of *future* and the eight present items on the factor of *present*. The results indicated that one of the items on the future factor needed to be deleted in order for the model to fit well. We therefore excluded that item, and the resulting indices suggested a reasonably good fit of the model (Comparative Fit Index [CFI] = .902, Root Mean Squared Error of Approximation [RMSEA] = .066, Standardized Root Mean Squared Residual [SRMR] = .061).

Control variables

Several variables were measured and included in the following analyses as control variables. They included demographic variables (sex, age, and education), as well as baseline behavioral measures, as described below. The initial desire to quit was tapped by this question on a scale of 1–7: how strong is your desire to stop smoking altogether at this time? ($M = 5.03$, $SD = 1.81$). Participants were also asked to report whether they had smoked at least 100 cigarettes in their entire life (94.8% yes, 5.2% no) and the last time they had a cigarette (59.1% within an hour, 18.2% more than an hour ago, 6.2% more than three hours ago, 6.7% more than five hours ago, 9.8% more than 12 hours ago).

Results

Manipulation check

As a manipulation check, two coders unaware of the experimental conditions analyzed responses to the future- versus present-thinking manipulation on a randomly-selected subset of the sample ($n = 95$, or 10%). Recall that the future-versus present-thinking manipulation asked the participants to take a moment to think about the future and what their life would be like in 10 years (the future-thinking condition) or during the rest of the day (the present-thinking condition) and write down their thoughts in a provided text box. The two coders analyzed each text entry and recorded “–1” if the text was consistent with an immediate, present outlook and “1” if the text was consistent with a distant, future outlook. They recorded “0” if the text was ambiguous in temporal outlook. The thoughts were classified into the immediate, present outlook category if they referred to specific things that would happen during the rest of the day. Conversely, the thoughts were classified into the distant, future outlook category if they referred to specific things that would happen in the distant future: that is, in ten years. Inter-coder reliability was high (Krippendorff’s $\alpha = .89$). Averaging the two coders’ judgments, we compared the present and future conditions in terms of the temporal outlook of the thoughts generated by the respondents. The results indicated that the present-thinking condition generated thoughts that were consistent with an

immediate, present outlook ($M = -0.77$, $SD = 0.54$), whereas the future-thinking condition generated thoughts that were consistent with a distant, future outlook ($M = 0.92$, $SD = 0.29$), and the difference was statistically significant ($t[93] = -18.96$, $p < .001$).

We also examined whether the future- versus present-thinking manipulation had resulted in any change in time orientation (present and future time orientation). Our assumption was that time orientation is a dispositional trait that ought not to be influenced by situational cues. The Zimbardo Time Perspective Inventory (Zimbardo et al., 1997), which we used to measure time orientation, had been developed to specifically tap into a dispositional tendency to consider immediate or future outcomes. To check if this assumption was upheld, we conducted an independent-samples t -test, comparing the present-thinking condition and the future-thinking condition in terms of the two dimensions of time orientation. The test results suggested that, as expected, neither present time orientation ($t[944] = .015$, $p = .988$) nor future time orientation ($t[944] = -.856$, $p = .392$) was influenced by the future- versus present-thinking manipulation.

Hypothesis testing

The correlations among key variables are reported in Table 1. H1 through H3 hypothesized significant effects of time orientation and future (vs. present) thinking, prior to seeing graphic cigarette warning labels, on intentions to smoke and intentions to quit. To test H1 through H3, we conducted two ordinary least squares (OLS) regression analyses, one for each dependent variable. The predictors in both regression models included the six control variables described above (sex, age, education, initial desire to quit, smoked at least 100 cigarettes, last time had a cigarette), present time orientation (PTO), future time orientation (FTO), and the experimental manipulation (future vs. present thinking).

Results of the regression analyses are summarized in Table 2. Several control variables emerged as significant predictors of intentions to smoke (age, education, smoked at least 100 cigarettes in lifetime, last time smoked, initial desire to quit) and intentions to quit (sex, last time smoked, initial desire to quit). Details of the findings can be found in Table 2.

Of main interest to this study, PTO was a significant predictor of intentions to smoke, but not intentions to quit. Participants with a stronger present time

Table 1 Correlations Among Key Variables

	PTO	FTO	Perceived Self-Efficacy	Intentions to Smoke
FTO	.194*			
Perceived self-efficacy	.126*	.380*		
Intentions to smoke	.035	.018	-.148*	
Intentions to quit	.037	.186*	.391*	-.319*

Note. FTO = Future Time Orientation; PTO = Present Time Orientation. * $p < .01$.

Table 2 Effects of Time Orientation and Future (vs. Present) Thinking on Intentions to Smoke and Intentions to Quit

	DV: Intentions to Smoke			DV: Intentions to Quit		
	<i>b</i>	<i>t</i>	ΔR^2	<i>b</i>	<i>t</i>	ΔR^2
Sex	−.069	−0.635		−.159*	−2.498	
Age	.011*	2.528		−.002	−0.706	
Education	.118*	2.335		.035	1.190	
Smoked 100 cigarettes	−.667**	−2.684		−.273	−1.881	
Last time smoked	−.328***	−7.929		.050*	2.055	
Initial desire to quit	−.080**	−2.728	.11***	.245***	14.274	.22***
PTO	.207**	3.041		−.050	−1.262	
FTO	.061	0.722	.01**	.142**	2.891	.01**
F vs. P Thinking	.051	0.496	.00	.088	1.455	.00

Note. ΔR^2 = change in R^2 for the block of variables; F vs. P Thinking = Future vs. Present Thinking; FTO = Future Time Orientation; PTO = Present Time Orientation. * $p < .05$, ** $p < .01$, *** $p < .001$.

orientation reported stronger intentions to smoke ($b = .208$, $p = .002$). In contrast, FTO was a significant predictor of intentions to quit, but not intentions to smoke. Participants with a stronger future time orientation reported stronger intentions to quit ($b = .151$, $p = .002$). As such, H1a and H2b are supported. H1b and H2a are not supported.

H3 predicted that thinking about the future (vs. present) prior to seeing graphic cigarette warning labels would decrease intentions to smoke and increase intentions to quit. However, neither effect was significant. H3 is not supported.¹

H4 predicted that thinking about the future (vs. present) prior to seeing graphic cigarette warning labels would increase perceived self-efficacy for quitting smoking. H5 predicted that thinking about the future (vs. present) prior to seeing graphic cigarette warning labels would have an indirect effect on quitting intentions through perceived self-efficacy.

To test H4, we conducted an OLS regression analysis, in which the predictors included the six control variables (sex, age, education, initial desire to quit, smoked at least 100 cigarettes, last time had a cigarette) in addition to the key predictor: future (vs. present) thinking. The dependent variable was perceived self-efficacy for quitting smoking. Results of the regression analysis are summarized in Table 3. A number of control variables emerged as significant predictors of perceived self-efficacy (age, last time smoked, initial desire to quit). Details of the findings can be found in Table 3. Of main interest to this study, thinking about the future (vs. present) prior to seeing graphic cigarette warning labels resulted in greater perceived self-efficacy ($b = .204$, $p = .027$). H4 is supported.²

Table 3 Effects of Future (vs. Present) Thinking on Perceived Self-Efficacy for Quitting Smoking

	DV: Perceived Self-Efficacy		
	<i>b</i>	<i>t</i>	ΔR^2
Sex	-.039	-0.403	
Age	-.009*	-2.453	
Education	.008	0.189	
Smoked 100 cigarettes	-.306	-1.387	
Last time smoked	.089*	2.422	
Initial desire to quit	.235**	9.166	.11**
F vs. P Thinking	.204*	2.219	.01*

Note. ΔR^2 = change in R^2 for the block of variables; F vs. P Thinking = Future vs. Present Thinking. * $p < .05$, ** $p < .001$.

Figure 1 The indirect effect of future (vs. present) thinking on intentions to quit smoking through perceived self-efficacy. * $p < .05$; ** $p < .01$.

To examine whether thinking about the future (vs. present) prior to seeing graphic cigarette warning labels had an indirect effect on quitting intentions through perceived self-efficacy, we conducted a mediation analysis using Preacher and Hayes' (2008) INDIRECT SPSS macro. All six control variables were included in the analysis. The results indicated that although the total effect of future (vs. present) thinking on intentions to quit was not statistically significant, the indirect effect of future (vs. present) thinking on intentions to quit was significant (indirect effect = .039, 95% confidence interval .006–.081). Specifically, future (vs. present) thinking led to significantly greater perceived self-efficacy ($b = .240$, $p = .027$), which then resulted in stronger intentions to quit ($b = .193$, $p < .001$; see Figure 1).

Discussion

Time plays an important role in health-related decision-making and how people respond to health warning messages. Communication literature in general has paid very limited attention to how time is used in persuasive messages and how individual

time orientation affects the processing of these messages and, ultimately, their persuasiveness. The current research is an attempt to address the critical role of time in persuasive communication and, in particular, examine how a future time orientation might be temporarily activated so as to alter individuals' receptivity to long-term health warning messages. While advancing our understanding of the interaction between individual time orientation and a message's temporal focus, this research presents EFT as a promising tool for health communication intervention.

Revolving around the concept of time, this study set out to examine the influence of both dispositional and situational time orientation on African American smokers' intentions to smoke and intentions to quit after they had been exposed to graphic cigarette warning labels. Consistent with the findings of many previous studies (e.g., [Adams, 2009](#); [Apostolidis et al., 2006](#); [Hall et al., 2012](#); [Keough et al., 1999](#)), our results indicate a strong link between time orientation and smoking/quitting intentions. Specifically, we found that a greater PTO was associated with stronger intentions to smoke, whereas a greater FTO was associated with stronger intentions to quit. The fact that the two dimensions of time orientation predicted different outcomes is intriguing and speaks to the value of treating PTO and FTO as orthogonal dimensions of time orientation ([Arnocky et al., 2014](#); [Joireman et al., 2012](#); [Zimbardo & Boyd, 1999](#)). It appears PTO overall predicts how likely people are to engage in indulgent behaviors, such as smoking and drug use. In contrast, FTO seems to be predictive of how likely people are to engage in self-control behaviors, such as quitting smoking or refraining from drug use. The literature tends to support these conjectures, as PTO has often been found to predict unhealthy behaviors, such as tobacco smoking, alcohol use, and drug use ([Adams, 2009](#); [Apostolidis et al., 2006](#); [Hall et al., 2012](#); [Keough et al., 1999](#)), whereas FTO has often been shown to be associated with healthy behaviors, such as physical activity, wearing a seatbelt, adhering to physician advice, and mammography uptake ([Adams & Nettle, 2009](#); [Daugherty & Brase, 2010](#); [Lukwago et al., 2003](#); [Sweeney & Culcea, 2017](#); [Van Der Pol et al., 2017](#)). Theoretically, given the focus of PTO on immediate outcomes, it makes sense for PTO to be largely predictive of unhealthy behaviors, which tend to bring short-term satisfaction. Given the focus of FTO on long-term consequences, it seems plausible that FTO would predict healthy behaviors, which tend to be associated with long-term benefits.

Of greater interest, our study examined the impact of situational time orientation on smokers' intentions to smoke and intentions to quit after they had been exposed to graphic cigarette warning labels. We expected that participants who had engaged in EFT versus those who had engaged in episodic, present thinking prior to seeing the graphic cigarette warning labels would report stronger intentions to smoke and to quit smoking. This prediction was not borne out, however. We then looked into the possibility that future (vs. present) thinking would have an indirect effect on smoking intentions or intentions to quit through intervening variables. We specifically examined how future (vs. present) thinking might have an indirect effect on intentions to quit through enhanced perceived self-efficacy (i.e., perceived

ability to quit smoking). Our findings are supportive of the indirect effect hypothesis: future (vs. present) thinking led to significantly greater perceived self-efficacy for quitting smoking, which then resulted in stronger intentions to quit.

One caveat we discovered during the data analysis is the potential interaction between time orientation and EFT. There is some evidence that future time orientation (but not present time orientation) interacted with EFT to influence intentions to smoke (but not intention to quit). The interaction is such that, for those with extremely low future time orientation, EFT led to reduced smoking intentions. For those with extremely high future time orientation, EFT seemed to have the opposite effect. Yet, there is no interaction between time orientation and EFT for self-efficacy. The overall pattern of interactions is hardly coherent, but it appears to point to the possibility of an important interplay between chronic time orientation and EFT for message effects.

The current research joins other previous studies (Joireman et al., 2008; Kim et al., 2017; Price et al., 2017; Wills et al., 2001) to show that time orientation is intricately linked to self-efficacy or self-control. While most of the other studies demonstrated that time orientation is correlated with self-control, the current study provides evidence for a causal link. If enhancing future orientation through EFT leads to improved self-control, which then leads to quitting unhealthy behaviors, then EFT may be a promising tool for health promotion and for increasing the persuasiveness of health warning messages in general.

It should be noted that, in the current research, the term self-efficacy is used interchangeably with the term self-control. In the context of quitting substance use or other unhealthy behaviors, perceived self-efficacy is closely related to perceived self-control: one's perceived ability to refrain from enacting the unhealthy behavior. However, not all forms of self-efficacy involve self-control. In the realm of adopting healthy behaviors, perceived self-efficacy often relates to one's perceived skills to perform the behavior, especially when it is a one-time behavior. For example, intentions to perform a breast self-examination for cancer detection critically depend on one's perceived skills to perform this behavior. It is not clear whether EFT would have any impact on perceived self-efficacy, as related to a perceived level of skill. It likely would not. However, by and large, EFT should have a positive impact on the adoption of healthy behaviors or responses toward health messages promoting such behaviors, given that an enhanced future orientation will increase an emphasis on the long-term outcomes of one's behavior.

Future research is needed to ascertain whether there is an indirect effect of future (vs. present) thinking on intentions to smoke and what the intervening variables might be. We suspect, however, that EFT may not be particularly effective in reducing intentions to smoke. As shown in our research, future time orientation, as a dispositional trait, did not predict intentions to smoke; present time orientation did. If a present time orientation did predict stronger intentions to smoke, we should have observed a difference in intentions to smoke between participants who engaged in present thinking and those who engaged in future thinking. However, we suspect that, unlike future orientation, which can be temporarily activated,

present orientation might be less susceptible to situational influences. After all, most people live in the present.

Several limitations of the current study need to be acknowledged. First, EFT did not directly induce changes in intentions to smoke or intentions to quit, as we had predicted. It did, however, cause changes in perceived self-efficacy and indirectly influenced quitting intentions. While the indirect effect is important and consistent with theory, we reflected upon the future (vs. present) thinking manipulation used in our study and were curious as to whether the manipulation could have been strengthened by encouraging participants to generate more vivid images of future events. Future research may explore the differential effects of different types of manipulations for inducing future thinking.

Second, it is not clear if/how future (vs. present) thinking prior to message exposure will interact with message features to influence message persuasiveness. For instance, how might EFT influence smokers' responses to graphic cigarette warning labels that focus on the short-term consequences of smoking? Would EFT be counterproductive in this scenario? While it is beyond the scope of the current study to address this question, we believe examining the interaction between future (vs. present) thinking and message features is a particularly fruitful path for future communication research. Also, it might be helpful to test the impact of future versus present thinking with an added "no manipulation" condition, which would allow us to determine whether thinking about the future or past would make any difference, as compared to no such thinking at all.

Third, the measure of intention to quit smoking used in our study is based on the core assumption of the transtheoretical model (Prochaska et al., 2002) that behavior change (e.g., quitting smoking) should not be construed as a finite event. Rather, a temporal dimension should be incorporated into such measures to capture the evolving nature of behavior changes. In other words, measuring intentions to quit by simply asking participants how likely they would be to quit (the conventional measure) fails to capture the temporal nuances in quitting intentions. Nevertheless, it is not clear whether our results would be replicated should a more conventional measure of quitting intentions be used.

Fourth, although we used multiple health messages in our study, they all represented the same class of messages: graphic warning labels. The extent to which our findings can be generalized to other classes of health messages (e.g., print ads, TV commercials, etc.) is uncertain. Additionally, our experiment was conducted with African American smokers only. While research on this disadvantaged population is sorely needed, we need to be cautious when generalizing the results to smokers of other racial/ethnicity backgrounds.

Fifth, we observed the short-term effects of EFT on responses to graphic cigarette warning labels. The extent to which the short-term effects would translate into long-term impacts is not clear. Relatedly, an intention to quit smoking is not the same as actual quitting behavior. Future research is needed to ascertain the

long-term impact of EFT on quitting behavior. We suspect that for the EFT intervention to work effectively, it needs to be implemented on a regular basis, such as through text messaging via mobile phones, to sustain a high level of future orientation among smokers. It may be particularly important to activate a future orientation through this intervention before smokers are exposed to smoking cessation messages. In any event, we need to be cautious not to overgeneralize the results of the current research to any sustained, long-term effects, without such effects being empirically assessed and corroborated.

Moreover, demand characteristics are always a concern for experimental studies. We adopted a manipulation of EFT that had been used in past research (Dassen et al., 2016; Stein et al., 2016). The possibility for demand characteristics is reduced with the thinking manipulation and the second task (message viewing or other tasks) being presented as separate tasks in the study. Nevertheless, we believe it is important for future studies to check for demand characteristics by probing research participants upon study completion.

Finally, the effect sizes associated with our findings are generally small. Although small effect sizes are not uncommon for psychological and communication research, they pose challenges as we seek to determine the practical impact of the intervention explored in the current work. We need to be cautious not to overinterpret the findings, given the small effect sizes. However, it should be noted that the current experiment used a one-time, brief manipulation of EFT and was able to detect some impact on persuasive outcomes. The cumulative effect of EFT done over a sustained period of time may not be trivial.

This research highlights an area of weakness in traditional health message design—focus on the long-term consequences of healthy or unhealthy behaviors—within the context of understanding an individual's tendency to discount future outcomes. The current study raised the possibility of temporarily activating a future orientation through EFT to make message recipients more receptive to long-term health messages and their recommendations. This experiment provided preliminary evidence that EFT has the potential to influence message persuasiveness through enhancing perceived self-efficacy. Although our findings are far from conclusive, we believe greater attention to the utility of EFT in health communication interventions will lead to fruitful discoveries of innovative approaches to enhancing receptivity to health messages.

Supplementary Material

Supplementary material is available at *Human Communication Research* online.

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Notes

- 1 There is some evidence that future time orientation (but not present time orientation) interacted with EFT to influence intentions to smoke (but not intentions to quit; $p = .03$). The interaction is such that, for those with extremely low future time orientations, EFT led to reduced smoking intentions. For those with extremely high future time orientations, EFT seemed to have the opposite effect. This caveat is discussed at the end of the paper.
- 2 The interactions between time orientation (future orientation and present orientation) and EFT for self-efficacy were not significant.

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