Temporal Framing Effects Differ for Narrative Versus Non-Narrative Messages: The Case of Promoting HPV Vaccination

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Abstract
Building upon extant research on temporal framing effect (i.e., relative persuasiveness of present- vs. future-oriented messages), this study investigates whether temporal framing effect differs for narrative versus non-narrative messages in the context of promoting human papillomavirus (HPV) vaccination among young adults. Results of a controlled experiment (N = 416) indicated that a present-oriented (vs. future-oriented) message led to more favorable attitudes and stronger intentions and perceived vaccine efficacy when the messages were presented in a narrative format, whereas a future-oriented (vs. present-oriented) message resulted in similar attitudes, intentions, and perceived vaccine efficacy when the messages were presented in a non-narrative format. Theoretical and practical implications of the findings are discussed.

Keywords
consideration of future consequences, temporal framing, narrative, HPV, HPV vaccine

The role of time reference in persuasion has recently garnered research attention (e.g., Kees, 2011; Nan, Zhao, Yang, & Iles, 2015; Orbell & Kyriakaki, 2008). It has been suggested that present-oriented messages, which focus on the immediate consequences of an advocated behavior, should be more effective than future-oriented messages, which describe the same consequences as occurring in the distant future (e.g., Chandran

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Empirically, several studies have found that the relative persuasiveness of present-versus future-oriented messages is at least contingent on characteristics of message recipients (Kees, 2010, 2011; Kim & Nan, 2016; Orbell & Kyriakaki, 2008; Zhao, Nan, Iles, & Yang, 2015).

Extending previous research, the current study attempts to investigate whether temporal framing effects (i.e., relative persuasiveness of present- vs. future-oriented messages) differ as a function of other message features, in particular, whether a message is narrative-based or non-narrative-based. A narrative message is composed of a series of events causally and sequentially linked, where specific characters are featured (Dahlstrom & Ho, 2012), often referred to as a story. A non-narrative message, in contrast, typically contains expository or didactic forms of information that make claims based on evidence and reasons (Kreuter et al., 2007).

We develop hypothesis concerning the interaction between temporal framing and narrative versus non-narrative message format based on construal level theory (CLT; Trope & Liberman, 2000), which argues that people form different mental representations of events depending on whether the event occurs in the near future or the distant future. According to CLT, immediate events are associated with more concrete mental representations or low-level construals (e.g., watching television tomorrow may mean flipping channels on the sofa), whereas distant events are associated with more abstract mental representations or high-level construals (e.g., watching television next year may mean being entertained; Liberman & Trope, 1998). We propose that processing of future-oriented messages and non-narrative messages should result in high-level construals and that processing of present-oriented messages and narrative message should lead to low-level construals. Matching of construal levels within a message, we argue, is expected to enhance message persuasiveness.

We investigate the interaction between temporal framing and narrative versus non-narrative message format in the important context of health messages promoting human papillomavirus (HPV) vaccination among young adults. HPV is the most common sexually transmitted infection in the United States; approximately 79 million Americans are already infected with HPV and an additional 14 million are being newly diagnosed each year (Centers for Disease Control and Prevention [CDC], 2014). HPV is the leading cause of cervical cancer. Each year, more than 10,000 women in the United States are diagnosed with cervical cancer (CDC, 2014) and over 70% of cervical cancers are caused by HPV (National Cancer Institute, 2011). Although HPV vaccines have proved to be highly effective in preventing HPV (CDC, 2012), public acceptance of HPV vaccines has not been satisfactory, especially among young adults. According to the National Immunization Survey (NIS) data for 2011, only 43.1% of females aged 19 to 21 years and 21.5% of females aged 22 to 26 years have received at least one of the three required shots. Coverage was even much lower among males (e.g., 2.8% of males aged 19-21 years and 1.7% of those aged 22-26; CDC, 2013). The CDC recommends that all kids who are 11 or 12 years old should get the three-dose series of HPV vaccine to protect against HPV. Young women can get HPV vaccinated through age 26, and young men can get vaccinated through age 21 (through age 26 among high-risk groups; CDC, 2015).
**Temporal Framing**

Recently, scholars (e.g., Chandran & Menon, 2004; Kees, 2011; Nan et al., 2015; Orbell & Hagger, 2006; Orbell & Kyriakaki, 2008; Orbell, Perugini, & Rakow, 2004; Strathman, Gleicher, Boninger, & Edwards, 1994) have started attending to the implications of temporal framing for message persuasive effects. This line of research mainly focuses on the relative persuasiveness of present-oriented messages that focus on the immediate consequences of a behavior (e.g., “Exercise gives you a quick energy boost”) versus future-oriented messages that emphasize the distant outcomes of the behavior (e.g., “Exercise makes you more energetic in the long run”).

Two theoretical perspectives suggest that present-oriented messages might be more persuasive than future-oriented messages. First, CLT (Trope & Liberman, 2000) argues that temporal distance alters how individuals construe an event, and such altered mental representations affect individuals’ evaluations and choices. In specific, CLT suggests that individuals perceive a distant event in more abstract, schematic, and decontextualized terms (i.e., high-level construals) and a proximal event in more concrete, detailed, and contextualized terms (i.e., low-level construals). For example, Liberman and Trope (1998) found that moving into a new apartment was perceived differently depending on time reference. To their study participants, moving occurring next year meant starting a new life whereas the same event occurring tomorrow meant packing and carrying boxes. Drawing upon CLT, Chandran and Menon (2004) tested the effects of temporal framing on risk perception in three health-related contexts (i.e., mononucleosis, cell phone radiation, and heart disease). They found that health risks framed in a proximal term (i.e., “Every day, a great many people die of cancer”) resulted in greater perceived risks, health-concerns, and behavioral intention compared with the same risks framed in a distant term (e.g., “Every year, a great many people die of cancer”). Presumably, health risks framed in proximal terms are construed as more concrete and thus are more psychologically impactful compared with those framed in distant terms.

Similarly, temporal discounting research (Chapman, 1996; Chapman & Elstein, 1995) suggests that distant future outcomes tend to be easily discounted, compared with immediate outcomes. For example, people prefer immediately getting US$100 to receiving US$120 after 1 month (L. Green & Myerson, 2004). As such, it has been suggested that messages focusing on the distant consequences of an advocated action may be less persuasive than those focusing on the immediate consequences (Zhao et al., 2015).

More recently, however, research has suggested that temporal framing effects may be moderated by message recipients’ personality traits, particularly consideration of future consequences (CFC; Strathman et al., 1994). CFC is defined as “the extent to which individuals consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes” (Strathman et al., 1994, p. 743). According to Strathman et al. (1994), individuals high in CFC are more concerned with the future outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes.
behaviors, and thus, should be more persuaded by future-oriented messages, whereas those low in CFC are more concerned with immediate outcomes, and consequently, should be more persuaded by present-oriented messages. Studies found support for these predictions in various contexts such as environmental behaviors (Strathman et al., 1994), colorectal cancer screening (Orbell et al., 2004), type 2 diabetes screening (Orbell & Hagger, 2006), sunscreen use (Orbell & Kyriakaki, 2008), and obesity (Kees, 2010, 2011).

Although message recipients’ personality traits have been shown to moderate temporal framing effects, few studies have assessed the potential role of other message features in determining the relative persuasiveness of present- versus future-oriented messages. In particular, it is unknown whether temporal framing effects differ for narrative versus non-narrative messages, a key message feature that has recently received a great deal of research attention in persuasive communication (Hinyard & Kreuter, 2007).

**Narrative Versus Non-Narrative Messages**

Traditional persuasive messages are typically constructed with didactic arguments and/or statistical evidence, but persuasive messages can also be presented as stories or narratives. Narrative communication, defined as “a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed” (Kreuter et al., 2007, p. 222), has been suggested as a powerful tool for persuasion (Hinyard & Kreuter, 2007).

Several theoretical perspectives including the transportation-imagery model (M. C. Green & Brock, 2000), the extended elaboration likelihood model (Slater & Rouner, 2002), and the entertainment overcoming resistance model (Moyer-Gusé, 2008) suggest that narratives (vs. non-narratives) enhance message recipients’ engagement with the messages (i.e., transportation) and therefore are more persuasive. Empirical evidence regarding the relative effects of narratives versus non-narratives on belief, attitude, and behavior change has been mixed. For example, some studies found narratives to be more effective in increasing risk perception and behavioral intention (e.g., de Wit, Das, & Vet, 2008; McQueen, Kreuter, Kalesan, & Alcaraz, 2011). Others reported greater effectiveness of non-narratives in increasing risk perception (Baesler & Burgoon, 1994; Greene & Brinn, 2003) and inducing behavior change (Greene & Brinn, 2003). Still others found narratives and non-narratives to have similar impacts on risk perception (e.g., Nan, Dahlstrom, Richards, & Rangarajan, 2015) and attitudes toward a recommended behavior (Wilson, Mills, Norman, & Tomlinson, 2005). Allen and Preiss (1997), based on their meta-analysis, reported that non-narratives are slightly more persuasive than narratives, but other scholars (Winterbottom, Bekker, Conner, & Mooney, 2008) warned that the relative persuasiveness of narratives and non-narratives is still inconclusive. One way of making sense of these mixed findings is to investigate the potential interactions between narrative versus non-narrative message format and other message features.
Interactions of Temporal Framing and Narrative Versus Non-Narrative Message Format

As CLT (Trope & Liberman, 2003) would suggest, present-oriented messages, which focus on the immediate outcomes of a behavior, are likely to produce more low-level construals, whereas future-oriented messages, which focus on the distant outcomes of the behavior, are likely to generate more high-level construals. Based on the premise of CLT, we propose that narrative versus non-narrative messages could be associated with different levels of construals as well, a possibility that has not been assessed, conceptually or empirically, in past research.

By definition, narratives involve a “sequence of events influenced by the actions of specific characters” (Dahlstrom & Ho, 2012, p. 593). Detailed illustration of an event, context, character, or action as well as concrete emotions or beliefs that the character holds within a narrative may be conveyed. For example, the testimony of a female breast cancer survivor conveys her characteristics (e.g., demographics, socioeconomic status), how she detected the cancer, and how she feels about having a mammogram. Such concrete representation regarding breast cancer and having a mammogram may lead to low-level construals by adding rich details. In contrast, non-narratives are typically constructed with didactic arguments and/or statistical evidence. Such information is often abstract and decontextualized, and therefore is expected to be associated with high-level construals.

Matching the construal level of temporal framing and that of the narrative versus non-narrative message format may lead to higher processing fluency, that is, the extent to which a message is easy to process, which has been shown in numerous studies to ultimately enhance persuasive outcomes (Lee, 2001; Lee & Labroo, 2004; Mandler, Nakamura, & Van Zandt, 1987). Although limited, evidence supporting a positive effect of message feature matching on processing fluency exists. Lee and Aaker (2004), for example, demonstrated that a gain-framed message (i.e., a persuasive message focusing on the positive outcomes of adopting the recommended action) is more persuasive when it is matched with a promotional (e.g., “Preliminary medical research suggests that drinking purple grape juice may contribute to the creation of greater energy! . . . Get Energized!”) versus preventional (i.e., “Preliminary medical research suggests that drinking purple grape juice may contribute to healthy cardiovascular function! . . . Prevent Clogged Arteries!”) regulatory focus. Similarly, a loss-framed message (i.e., a persuasive message focusing on the negative outcomes of not adopting the recommended action) is more effective when it is matched with a preventional versus promotional regulatory focus. The researchers further showed that the matched conditions resulted in higher processing fluency, which led to enhanced persuasive effects.

As such, we expect that matching a narrative message with present-oriented (vs. future-oriented) temporal framing will lead to more favorable persuasive outcomes. In addition, matching a non-narrative message with future-oriented (vs. present-oriented) temporal framing should lead to greater persuasive effects. Formally, we propose the following hypothesis concerning the interaction between temporal framing and
narrative versus non-narrative message format in the context of promoting HPV vaccination:

**Hypothesis 1 (H1):** Temporal framing and narrative versus non-narrative message format will interact such that (a) for narrative messages, present-oriented (vs. future-oriented) framing will lead to more favorable attitudes toward HPV vaccination and intentions to get HPV vaccination and (b) for non-narrative messages, future-oriented (vs. present-oriented) framing will lead to more favorable attitudes toward HPV vaccination and intentions to get HPV vaccination.

Temporal framing and narrative versus non-narrative message format have both been shown to influence specific health beliefs. Present-oriented messages increase perceived health risks in various contexts (i.e., mononucleosis, cell phone radiation, heart disease; Chandran & Menon, 2004). A narrative (vs. non-narrative) format increases perceived risk of diseases such as Hepatitis B virus (de Wit et al., 2008) and breast cancer (McQueen et al., 2011) while decreasing perceived barriers in obtaining a mammogram (McQueen et al., 2011). Statistical information was found to increase perceived susceptibility to skin cancer (Greene & Brinn, 2003). It is unclear, however, if or how the interaction between these two message features would exert effects on specific health beliefs. Previous literature tends to focus on attitudes and/or intentions as indicators of persuasive outcomes. No previous study has examined the interactive effects of temporal framing and narrative versus non-narrative message format on health beliefs. Understanding these effects would help elucidate the underlying mechanisms for the (potential) interaction effects on attitudes and intentions. Given the lack of related research, we propose the following research question:

**Research Question 1 (RQ1):** Will temporal framing interact with narrative versus non-narrative message format to influence specific health beliefs including perceived susceptibility to the health risk (HPV), perceived severity of the health risk (HPV), perceived benefits of performing the recommended behavior (HPV vaccination), and perceived barriers of performing the recommended behavior (HPV vaccination)?

**Method**

**Participants and Procedure**

A web-based experiment using a 2 (temporal framing: present-oriented vs. future-oriented) × 2 (message format: narrative vs. non-narrative) factorial design was conducted. Undergraduate students were recruited from a large Eastern university in the United States to participate in the study in exchange for course credit. Those who had received any HPV shot were excluded from the study. As the final sample, 416 students (\(M_{age} = 20.05, SD = 2.37; 33.7\%\) female; 57.2\% White, 19.5\% Asian, 16.3\% Blacks, 6.3\% Hispanic, and 0.7\% Others) participated in the study.
After receiving the university’s institutional review board approval, we invited the participants to a web page, where they were asked to read and digitally sign an informed consent form and then were randomly assigned to one of the four experimental conditions. Participants first responded to a set of preliminary questions assessing their prior knowledge about HPV and the HPV vaccine, and then were presented with a message promoting HPV vaccination, which was either present-oriented or future-oriented and in either narrative or non-narrative format. After reading the message, participants were asked to respond to a battery of questions measuring several variables, including attitudes and intentions toward HPV vaccination, manipulation checks, and demographic information. At the end of the survey, participants were debriefed and thanked. It took about 20 minutes for participants to complete the study.

**Message Stimuli**

In the beginning of the health message, basic information regarding HPV and the HPV vaccine was provided. Then, two features of the message were experimentally manipulated: temporal framing and narrative versus non-narrative message format. Following prior studies (e.g., Kees, 2011), we manipulated temporal framing by altering the time frame in which the health benefits of the HPV vaccine were obtained. The present-oriented message focused on the short-term benefits of HPV vaccination, while the future-oriented message focused on the long-term benefits of the vaccine. At the same time, the message was presented in either narrative or non-narrative format. The narrative messages contained reference to a specific character and were presented in a story format. The non-narrative messages made no reference to a specific character and were presented in a didactic format. The message stimuli are reported in Table 1.

**Key Measures**

Unless indicated otherwise, 7-point items were used and averaged to form an index for each construct. Higher scores indicated more positive beliefs, attitudes, or greater intentions toward vaccination.

*Attitude toward HPV vaccination.* Attitude toward HPV vaccination was measured using three semantic differential scales (e.g., very harmful-very beneficial, very foolish-very wise, and very bad-very good) adapted from past research (Ajzen, 2006; Orbell et al., 2004) in response to the question “Getting vaccinated against the human papillomavirus (HPV) is” (Cronbach’s $\alpha = .95$, $M = 5.99$, $SD = 1.17$).

*Intention toward HPV vaccination.* Intention was measured using six items adapted from Nan (2012). Participants were asked to imagine the scenario that the HPV vaccine was offered either free or with a retail price of US$360. For each scenario, three items assessed intentions of obtaining the vaccine (e.g., “How likely would you be to get the HPV vaccine in the future?”; free: Cronbach’s $\alpha = .92$, $M = 4.76$, $SD = 1.70$; paid: Cronbach’s $\alpha = .91$, $M = 2.94$, $SD = 1.53$).
Communication Research

Eight specific health beliefs were measured, including perceived susceptibility to the health risk (HPV), perceived severity of the health risk (HPV), and perceived benefits and barriers of adopting the recommended behavior (HPV vaccination). Three items assessed perceived susceptibility (e.g., “It is likely that I will contract the HPV”; $\alpha = .79$, $M = 3.41$, $SD = 1.31$). Three items assessed perceived severity (e.g., “I believe that the HPV is extremely harmful”; $\alpha = .73$, $M = 4.64$).

Table 1. Message Stimuli Used in the Experiment.

<table>
<thead>
<tr>
<th>Present-oriented</th>
<th>Future-oriented</th>
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<tr>
<td><strong>Narrative</strong></td>
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<td>Genital HPV is the most common sexually transmitted virus in the United States. More than half of sexually active men and women are infected with HPV at some time in their lives. HPV is usually spread through sexual contact. Clinical trials showed that the HPV vaccine was highly effective against high-risk HPV types, which are responsible for cervical cancer in females and anal cancer in both males and females. “I know the HPV vaccine works fast to protect my body,” said Ashley, a University of X student who recently got vaccinated against HPV, “Right after I got the HPV vaccine, I felt a huge sense of relief!”</td>
<td>Genital HPV is the most common sexually transmitted virus in the United States. More than half of sexually active men and women are infected with HPV at some time in their lives. HPV is usually spread through sexual contact. Clinical trials showed that the HPV vaccine was highly effective against high-risk HPV types, which are responsible for cervical cancer in females and anal cancer in both males and females. “I know the HPV vaccine provides long-lasting protection to my body,” said Ashley, a University of X student who got vaccinated against HPV several years ago, “It has been several years since I got the vaccine, I am still feeling a huge sense of relief!”</td>
</tr>
<tr>
<td><strong>Non-narrative</strong></td>
<td></td>
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<tr>
<td>Genital HPV is the most common sexually transmitted virus in the United States. More than half of sexually active men and women are infected with HPV at some time in their lives. HPV is usually spread through sexual contact. Clinical trials showed that the HPV vaccine was highly effective against high-risk HPV types, which are responsible for cervical cancer in females and anal cancer in both males and females. The HPV vaccine works fast to protect your body. Imagine the huge sense of relief you will feel immediately after you have received the HPV vaccine!</td>
<td>Genital HPV is the most common sexually transmitted virus in the United States. More than half of sexually active men and women are infected with HPV at some time in their lives. HPV is usually spread through sexual contact. Clinical trials showed that the HPV vaccine was highly effective against high-risk HPV types, which are responsible for cervical cancer in females and anal cancer in both males and females. The HPV vaccine provides long-lasting protection to your body. Imagine the huge sense of relief you will feel years after you have received the HPV vaccine!</td>
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Note. HPV = human papillomavirus.

Health beliefs. Four specific health beliefs were measured, including perceived susceptibility to the health risk (HPV), perceived severity of the health risk (HPV), and perceived benefits and barriers of adopting the recommended behavior (HPV vaccination). Three items assessed perceived susceptibility (e.g., “It is likely that I will contract the HPV”; $\alpha = .79$, $M = 3.41$, $SD = 1.31$). Three items assessed perceived severity (e.g., “I believe that the HPV is extremely harmful”; $\alpha = .73$, $M = 4.64$,
Three items assessed perceived benefits of HPV vaccination, operationalized as perceived vaccine efficacy in preventing HPV (i.e., “I believe the HPV vaccine works in preventing the HPV”; “I believe the HPV vaccine is effective in preventing the HPV”; “I believe if I get the HPV vaccine, I will be less likely to get the HPV”; α = .82, M = 5.30, SD = 1.14). The above nine items were adapted from Witte’s Risk Behavior Diagnosis Scale (Witte, Meyer, & Martell, 2001). Six items adapted from McRee, Brewer, Reiter, Gottlieb, and Smith (2010) assessed perceived barriers. The first three assessed safety concerns (e.g., “The HPV vaccine is unsafe”; α = .60, M = 3.78, SD = 1.10) and the other three assessed perceived logistic/financial barriers (e.g., “I am concerned that the HPV vaccine costs more than I can pay”; α = .77, M = 3.21, SD = 1.33).

Control variables. Age, gender, and two other variables—whether one had heard of HPV (78.4% yes and 21.6% no) and whether one had heard of the cervical cancer vaccine or HPV shot (68.5% yes and 31.5% no)—were included in the analyses as control variables. Having gender as a control variable was important, because women showed greater knowledge regarding HPV (Pearson’s χ² = 6.72, p = .01) and the HPV vaccine (Pearson’s χ² = 14.57, p < .001) than men.

Data Analysis Strategies

To address the hypothesis and research question, we conducted a series of analysis of covariance (ANCOVA). ANCOVA was chosen because it allows for group comparisons while controlling for the effects of other variables that are not of primary interest. As suggested in previous research (Kim & Nan, 2015), such variables might include age, gender, having heard of HPV, and having heard of the HPV vaccine. Through ANCOVAs, we first examined the main effects of temporal framing and narrative versus non-narrative message format. Then we assessed the interaction between these two message features.

Results

Manipulation Checks

Manipulation checks were performed on temporal framing (present-oriented vs. future-oriented) and message format (narrative vs. non-narrative) using a series of analyses of variance (ANOVAs). Results showed that participants in the present-oriented message condition perceived the message to focus more on the short-term benefits of getting the HPV vaccine (M = 3.54, SD = 0.95) than those in the future-oriented message condition (M = 3.34, SD = 1.00), F(1, 414) = 4.79, p = .03. Participants in the narrative message condition (M = 5.04, SD = 1.49) perceived the message to be written in a person’s narrative to a greater extent than those in the non-narrative message condition (M = 3.65, SD = 1.71), F(1, 414) = 78.70, p < .001. Therefore, both manipulations were considered effective.
Confirmatory Factor Analysis (CFA)

To determine the dimensionality among the key outcome variables, we submitted the 15 health belief items which measured five constructs (i.e., perceived susceptibility, perceived severity, perceived vaccine efficacy, perceived vaccine safety, and perceived logistic/financial barriers), the three items for attitudes, and the six items for two intention measures (i.e., with and without cost) to a CFA, specifying an eight-factor structure. Key indices suggested a good fit of the measurement model ($\chi^2 = 581.06, p < .001$, root mean square error approximation [RMSEA] = .06, comparative fit index [CFI] = .94, normed fit index [NFI] = .90), based on criteria recommended by Mueller and Hancock (2008) and Hu and Bentler (1999).

Main Results

H1 predicted that for narrative messages, present-oriented framing, compared with future-oriented framing, would lead to more favorable attitudes and intentions toward HPV vaccination, whereas for non-narrative messages, future-oriented framing, compared with present-oriented framing, would lead to more favorable attitudes and intentions toward HPV vaccination. To test H1, a series of ANCOVAs was conducted on attitudes and intentions toward HPV vaccination. Temporal framing and message format were entered as fixed factors, and four covariates were included (i.e., age, gender, having heard of HPV, having heard of the HPV vaccine) to control for possible effects of those variables. Results indicated that the main effects of message format were statistically significant on attitudes, $F(1, 408) = 4.71, p = .03$, and approached significance on intentions when the vaccine cost US$360, $F(1, 408) = 2.68, p = .10$.

Specifically, a non-narrative message led to more favorable attitudes ($M_{\text{non-narrative}} = 6.12$ vs. $M_{\text{narrative}} = 5.88$) and intentions ($M_{\text{non-narrative}} = 3.08$ vs. $M_{\text{narrative}} = 2.83$).

Of importance, the interaction effects of temporal framing and message format on attitudes, $F(1, 408) = 5.03, p = .03$; intentions when the vaccine was offered for free, $F(1, 408) = 3.90, p = .05$; and intentions when the vaccine cost US$360, $F(1, 408) = 3.93, p = .05$, were statistically significant. We conducted simple effects analyses (see Table 2 for descriptive statistics) to further determine the nature of the interactions.

For attitudes toward HPV vaccination, the results indicated that the present-oriented (vs. future-oriented) message yielded more favorable attitudes, $F(1, 408) = 3.85, p = .05$, when the messages were narrative-based. On the other hand, the future-oriented (vs. present-oriented) message led to similar attitudes when the messages were non-narrative-based.

For intentions to get the HPV vaccine when offered free of cost, the results indicated that the present-oriented (vs. future-oriented) message led to stronger intentions, $F(1, 408) = 4.03, p = .05$, when the messages were narrative-based. In contrast, the future-oriented (vs. present-oriented) message led to similar intentions when the messages were non-narrative-based. For intentions to get the HPV vaccine with cost, the results revealed a similar pattern. However, neither simple effect achieved statistical significance. Given the findings collectively, we considered H1 partially supported.
To address the research question, a series of ANCOVAs was conducted on health beliefs related to HPV and HPV vaccine. Temporal framing and message format were entered as fixed factors and four additional variables were included as covariates (i.e., age, gender, having heard of HPV, having heard of the HPV vaccine).

The main effect of message format was significant on perceived vaccine efficacy in preventing HPV, $p = .01$ ($M_{non-narrative} = 5.43$ vs. $M_{narrative} = 5.18$) and approached significance on perceived severity of HPV, $p = .06$ ($M_{non-narrative} = 4.76$ vs. $M_{narrative} = 4.53$). In both cases, the non-narrative (vs. narrative) messages led to more of the health belief.

Of importance, the interaction effect was significant on perceived vaccine efficacy in preventing HPV, $F(1, 408) = 8.68$, $p < .01$. Simple effects analyses (see Table 3 for descriptive statistics) showed that when the messages were narrative-based, the present-oriented (vs. future-oriented) message increased individuals’ perceived vaccine efficacy in preventing HPV, $F(1, 408) = 5.44$, $p = .02$. On the other hand, when the messages were non-narrative-based, the future-oriented (vs. present-oriented) message appeared to increase individuals’ perceived vaccine efficacy in preventing HPV, and this difference approached significance, $F(1, 408) = 3.43$, $p = .07$.

### Discussion

The purpose of the current study was to investigate the temporal framing effect, that is, the relative persuasiveness of present-oriented versus future-oriented messages and the potential moderating role of narrative versus non-narrative message format. Drawing upon CLT (Trope & Liberman, 2003), we posited that a present-oriented message would be more persuasive than a future-oriented message when the messages were presented in a narrative format. Conversely, we predicted that a future-oriented message would be more persuasive than a present-oriented message when the messages were presented in a non-narrative format.

As CLT posits, people use high-level construals to represent distant events and use low-level construals to represent proximal events. High-level construals tend to be associated with general, abstract, and goal-oriented aspects of an event, whereas low-level construals tend to be associated with specific, concrete, and non-goal-oriented aspects of an event.
aspects of an event. A central thesis of our research is that narratives, wherein a character describes specific details of an event, should be generally associated with low-level construals, whereas non-narratives, wherein summary of facts, statistics, and didactic arguments are typically presented, should be generally associated with high-level construals. The matching of a narrative consisting of low-level construals with a present-oriented temporal framing could result in what has been termed processing fluency (Lee, 2001; Lee & Labroo, 2004), making the message easier to process and resulting in greater message effectiveness. Likewise, the matching of a non-narrative consisting of high-level construals with a future-oriented temporal framing is likely to enhance message persuasiveness as well.

Results of the controlled experiment in the context of promoting HPV vaccination among young adults were largely consistent with our predictions. We found the interaction between temporal framing and message format to be significant for all three dependent variables of interest, that is, attitudes toward HPV vaccination and intentions to get the vaccine (free of cost and with cost). Our findings may be seen as consistent with previous studies demonstrating matching effects in persuasive messages (e.g., Lee & Aaker, 2004). Interestingly, the persuasive advantage of the present-oriented (vs. future-oriented) message was particularly strong under the narrative condition. It may be that the low construals produced by a short-term frame are most compatible with the low construals produced by a narrative message format, resulting in strong processing fluency.

In addition to the primary indicators of message effects (i.e., attitudes, intentions), we examined the interaction effects of temporal framing and narrative versus non-narrative message format on various health beliefs. We found that temporal framing and message format interacted to influence perceived vaccine efficacy in preventing HPV in a similar way as they did to influence attitudes and intentions. Specifically, the present-oriented (vs. future-oriented) message increased perceived vaccine efficacy in preventing HPV when the messages adopted a narrative format. In contrast, the
future-oriented (vs. present-oriented) message increased perceived vaccine efficacy when the messages were presented in a non-narrative format. Given the consistent patterns of interaction, we speculated that the joint effects of temporal framing and message format on attitudes and intentions occurred at least partially through perceived vaccine efficacy. This speculation is supported by previous research showing that perceived vaccine efficacy mediates a personality trait’s influence on vaccination behaviors (Kim & Nan, 2015; Morison, Cozzolino, & Orbell, 2010; Nan & Kim, 2014).

As communication research continues to explore the implications of time reference for message persuasiveness, our study suggests that the relative persuasiveness of present-oriented and future-oriented messages may not be a simple matter. We demonstrated that whether the messages are presented in a narrative or non-narrative format determines which temporal framing exerts more persuasive power. Our research, together with previous research on the moderating role of consideration for future consequences in temporal framing effects (e.g., Orbell et al., 2004; Strathman et al., 1994), calls for more systematic investigation of the impact of temporal framing as regulated by message- or audience characteristics.

Moreover, our findings related to the effects of narrative versus non-narrative message format were revealing. As mentioned earlier, several theoretical frameworks (M. C. Green & Brock, 2000; Moyer-Gusé, 2008; Slater & Rouner, 2002) suggest that narratives (vs. non-narratives) enhance message recipients’ engagement with the messages (i.e., transportation) and therefore should be more persuasive. Yet empirical evidence regarding the relative persuasiveness of narrative (vs. non-narrative) messages has been mixed. Adding to this body of literature, our findings appeared to suggest that overall non-narrative messages are more effective than narrative messages as in our experiment the non-narrative (vs. narrative) messages led to more favorable attitudes toward HPV vaccination and somewhat greater intentions to get the vaccine with cost. The non-narrative (vs. narrative) messages also induced greater beliefs in vaccine efficacy and HPV severity. However, the main effects of message format may be misleading without considering the interaction between message format and temporal framing.

Although not a central focus of this research, temporal framing indeed appeared to act as a moderator of the relative effects of narrative (vs. non-narrative) messages—overall, the narrative message was more persuasive than the non-narrative message when the messages were present-oriented, whereas the non-narrative message was more persuasive than the narrative message when the messages were future-oriented. As such, we believe that exploring message features that might moderate narrative effects is a fruitful path for future research on narrative persuasion.

Practical implications of our findings are straightforward. As health professionals develop messages to influence attitudes and behaviors and consider whether the short-term or long-term consequences of adopting a health behavior should be emphasized, they may see an increase in message persuasiveness if a present-oriented message is matched with a narrative format and if a future-oriented message is matched with a non-narrative format. The matching could not only enhance attitudes and intentions toward the advocated health behavior but also desirable beliefs about the behavior.
such as perceived effectiveness of the behavior in preventing the health problem (i.e., perceived response efficacy).

Of course, all conclusions and implications of this study need to be considered within several constraints. First, our sample consisted of college students only and therefore the findings cannot be generalized to other young adult populations. Although the participants in this study had not received the HPV vaccine, they might have high knowledge about the HPV vaccine as many of their peers had been vaccinated. Our baseline data indicated that 78.4% of the participants had heard of HPV and 68.5% had heard of the HPV vaccine. Second, the findings are necessarily tied to HPV vaccination as a unique preventive health behavior. It is unclear whether the same pattern of results would emerge in other health contexts such as the promotion of detection behaviors (e.g., mammography). Third, though our temporal framing manipulation was considered effective given the statistically significant difference across conditions, the mean difference was small. We suspect that the small difference might have attenuated temporal framing effects on HPV vaccination-related outcomes. Future research that utilizes stronger manipulations is indeed needed to fully capture temporal framing effects. Finally, our study measured intentions rather than actual behaviors. Intentions are a good, but not perfect, predictor of behavior. Future research may seek to determine the impact of temporal framing and narrative versus non-narrative message format on both short-term and long-term behaviors.

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