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Rated Measures of Narrative Structure for Written Smoking-Cessation Texts

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Abstract

This article describes the effect of a series of rated measures of narrative structure on recognition memory, agreement on story-relevant beliefs, and intention to engage in a health-related behavior—in this case smoking cessation. Using short smoking-cessation stories as stimuli, data were collected in a nationally representative sample of adult smokers ($n = 1,312$). Results suggested that messages rated as more sequential improved encoding and messages rated as containing more context decreased encoding. Messages rated high in transportation were associated with increased recognition, agreement with story-relevant beliefs, and intention to quit. Both positive and negative emotion were positively associated with intention to quit, but were negatively associated with recognition memory.

Smoking kills roughly 440,000 Americans each year (Centers for Disease Control and Prevention, 2009), and smoking cessation brings significant medium- and long-term positive effects, including lowered rates of coronary heart disease and lung and other types of cancer (e.g., Centers for Disease Control and Prevention, 2012). Motivation to quit is a significant predictor of smoking cessation (Jardin & Carpenter, 2012), and mediated message campaigns may be one way to motivate quitting (e.g., Wakefield, Spittal, Young, Durkin, & Borland, 2011).

However, developing mediated messages for smoking cessation is complicated. Smokers experience physiological craving when exposed to smoking-related cues (Perkins, 2009) and feel social pressure to continue to smoke (Lin & Ward, 2012). In addition, quitting may be more difficult due to a distrust of quit aids like nicotine replacement therapy (Yerger, Wertz, McGruder, Froelicher, & Malone, 2008) and a sense that quitting may be too difficult because smoking is a lifelong pattern (Eklund, Nilsson, Hedman, & Lindberg, 2012). This article examines the impact of narrative structural features on recognition memory, agreement with story-relevant beliefs, and intention to quit smoking after completing preliminary analysis on the psychometric properties of the narrative structural feature scales. Conceptually, some attributes of narratives may decrease resistance and thereby increase persuasiveness of and memory for smoking cessation messages.

LITERATURE REVIEW

There is increasing attention on the effect narratives have as a conveyance of health-related information (Cappella, 2006). Research suggests that narrativity may be a particularly important quality of health communication as it may increase memory for messages (e.g., Schank & Abelson, 1994), and messages high in narrativity may be more persuasive (Dunlop, Wakefield, & Kashima, 2010; Green, 2006; Green & Brock, 2000).

Narrativity and Memory

Research on messaging (or messages) with narrative qualities suggests that information presented in narrative form will yield greater recall than information that is presented in expository form. Narrative researchers have found that recall of narrative information is twice as likely as recall of expository information (e.g., Schank & Ableson, 1994). Graesser and Ottati (1995) suggesting that narrative information is more accessible because it contains themes, goals, and explanations that can be related to information that is frequently accessed. Two other possible explanations include (1) an increase in salience of pertinent information through a process like semantic priming that is similar to Graesser and Ottati's (1995) work (e.g., Brunel & Lavigne, 2009); and (2) narratives may provide or activate scripts or schemas, which in turn reduce the cognitive effort required for processing (Nelson, 2003; Rubin & Greenburg, 2003; Schank & Ableson, 1994).

Narrativity and Persuasion

There is evidence that being exposed to narratives increases agreement with story-relevant beliefs and increases the intention of the person exposed to the narrative to engage in behaviors suggested by the narrative. In an experiment that involved exposing subjects to television dramas, subjects were more likely to agree with the arguments in a narrative about the death penalty (Slater, Rouner & Long, 2006). In a between-subjects experimental study, Moyer-Gusé and Nabi (2010) found that narratives elicited greater parasocial interaction and reduced reactance. This leads to greater perceived vulnerability to a negative health-related event (Moyer-Gusé & Nabi, 2010). Igartua and Barrios (2012) found that exposure to a movie the authors believed was controversial was associated with greater negative attitudes toward the featured organization, Opus Dei, and organized religion, consistent with the primary message of the film.

There is also some evidence that exposure to a narrative may increase the intention to engage in behaviors or engagement in behaviors suggested in a narrative. Moyer-Gusé and colleagues found that after exposure to narratives modeling safer sex conversations that increased viewer identification with characters, subjects were more likely to discuss safer sex with their partners within the 2 weeks after viewing (Moyer-Gusé, Chung, & Jain, 2011). In a study of smoking cessation narratives, Kim and colleagues found that subjects who were exposed to smoking cessation information in exemplar form were more likely to intend to quit than subjects who were exposed to smoking cessation information in nonexemplar form (Kim, Bigman, Leader, Lerman, & Cappella, 2012).

Individual Differences and Narrativity

Much of the research examining narrativity has focused on narrative engagement, including transportation. Transportation is “a distinct mental process, an integrative melding of attention, imagery, and feelings” (Green & Brock, 2000, p. 701). Though transportation is often treated as an attribute of the message, in reality transportation measures the interaction between the reader of the story and the story itself, which may be a form of narrative engagement (Green, 2006; Green & Brock, 2000). Indeed, transportation can be treated as an individual difference, “transportability” (Dunlop, Wakefield, & Kashima, 2010; Escales, 2004). Though transportation and not transportability is being measured in this article, it is expected that transportation will be related both to structural features of narratives and to differences in individual responding to narratives generally. This should produce some correlation between transportation and narrative structural features, but this correlation should be somewhat lower than for narrative structural features and each other.

Choosing Narrative Structural Features

There are few clear, consistent definitions of what makes a narrative. Though Busselle and Bilandzic (2008) developed a coded measure of narrativity, they did not focus specifically on narrative structural features per se; instead, their work focused primarily on violations of expectations that might reduce or increase narrative engagement. Other work on narrativity has also focused on experiential aspects of message processing (e.g., Igartua & Barrios, 2012; Moyer-Gusé & Nabi, 2010), as opposed to attributes of the message that make it a narrative. It seems likely that narrativity describes a continuum along which messages can be more or less narrative-like. Therefore, a series of measures of narrative structure was developed. A series of analyses was designed to test validity of these measures and to distinguish between the individual difference components of transportation and the underlying narrative characteristics in order to understand whether manipulated structural features can produce increased memory and persuasion for health-related information beyond those produced by transportation. Both persuasion and memory are important dependent variables in this study, though they are not often included in the same study. While many health communication smoking cessation interventions focus on persuasion outcomes such as intention to quit (e.g., Kim, Bigman, Leader, Lerman & Cappella, 2012; Prochaska, Velicer, Fava, Rossi, & Tsoh, 2001) or agreement with relevant beliefs (e.g., Kim, Bigman, Leader, Lerman, & Cappella, 2012), remembering smoking cessation information may also be an important outcome (e.g., Durkin & Wakefield, 2010). For example, convincing someone to call a quit line may only be useful if they can actually remember the phone number for the quit line. Two primary theoretical perspectives, one focused on memory and one focused on persuasion, are employed to choose narrative structural features and describe how those structural features may be related to persuasion and memory outcomes. These two theories are the Limited Capacity Model of Mediated Message Processing (LC4MP), which describes structural features effects on memory, and the Extended Elaboration Likelihood Model (E-ELM), which describes persuasive processes.

Limited Capacity Model of Motivated Mediated Message Processing (LC4MP)

—The Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) was

used to select narrative structural features that might impact narrative processing and to design narrative structural feature measures to increase memory for cessation-related information. LC4MP is one of a class of single-pool processing models, which assume that humans are motivationally driven processors of information (Lang, 2006). LC4MP posits three processing stages: encoding, storage, and retrieval (Lang, 2006). Encoding is how information enters the brain, storage is the retention of information, and retrieval is pulling information from storage for use (Lang, 2006). All three processes are conceptualized to occur simultaneously, to a greater or lesser extent, and resource allocation to these three processes can be controlled or automatic.

Since narratives are associated with increased memory and narrative structural features are attributes of the narratives, it seems likely that these narrative structural features drive the increase in memory through increased resource allocation. Thus, narrative structural features, which these rated measures attempt to operationalize, were chosen based on attributes of the message that should either increase automatic allocation of cognitive resources to processing or decrease resources required to process the message. Based on LC4MP, the extant narrative literature, and pilot studies not being reported here, the four narrative structural features chosen were: emotional information (positive and negative), sequence, and context. Insofar as persuasion is central to health communication, persuasion outcomes were also considered in determining the effectiveness of these narrative structural features for health communication.

Extended Elaboration Likelihood Model (E-ELM)—Though the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986) has been profitably applied to describing persuasive processes in a number of communication contexts (e.g., Krueter & Wray, 2003), Slater and Rouner (2002) suggest that the application of the E-ELM may be more appropriate for persuasion in entertainment education and narratives. Since the E-ELM is so dependent on the ELM for many of the premises underlying the theory, the ELM is here explained and then expanded to the E-ELM.

The ELM posits two routes to persuasion based on the amount of elaboration an individual engages in: The first route is via “central” processing, which requires extensive elaboration, whereas the second route, “peripheral” processing, requires less elaboration. When individuals engage in central processing, often due to perceived direct impact of the content (Slater & Rouner, 2002), they are more likely to focus on the central arguments in a message (Andrews & Shimp, 1990) and are therefore more likely to be affected by both the quality of the content (e.g., Kang, Cappella, Strasser, & Lerman, 2009) and the valence of the message receiver’s content-related thoughts (Petty & Cacioppo, 1986). When individuals engage in peripheral processing they are more likely to focus on peripheral information in a message, such as speaker credibility (Petty & Cacioppo, 1986). However, this distinction is not without ambiguity—it is possible that peripheral information may become central, and therefore it is often difficult to categorize the receiver’s route to persuasion.

In the E-ELM it is even more difficult to distinguish between central and peripheral processes. The E-ELM was largely developed to describe the persuasion of messages contained in narrative and entertainment mediums (for example vicarious social

relationships), and the goals for consuming such media are likely different than those for other types of messages. In this context, the effect of the persuasion is mediated by narrative engagement and partially mediated by identification (Slater & Rouner, 2002). Research using E-ELM would suggest that individuals experience transportation and identification when exposed to narratives (e.g. Slater & Rouner, 2002). Identification and transportation may increase persuasion (Green & Brock, 2006). However, there is little research on attributes of messages that may be associated with transportation and identification beyond perceived similarity between the information processor and the characters in the message. If these attributes can be identified, it may be possible to increase persuasion through the mechanisms of identification and transportation.

Narrative Structural Features Chosen for Measure Development

Emotion LC4MP—Emotional information often increases allocation of cognitive resources to message processing (e.g., Lang, 2006). This article defines emotional information as valence and arousal. Valence can be conceptualized either as discrete emotion such as sadness, happiness, guilt, and so on (e.g., Nabi, 2010) or as activation of decoupled appetitive and aversive emotional systems at various levels of arousal (e.g., Lang, 2006). Arousal is the level of emotional activation, which is often associated with physiological arousal. In this case, discrete emotion items were collapsed to produce positive, negative and anger measures. Emotional information (both valence and arousal) should increase automatic allocation of resources until overload.

Emotion E-ELM—There is some evidence that emotional information may increase issue message involvement (e.g., Perse, 1990), which according to the E-ELM should induce more central processing of the narrative information and therefore may increase the persuasiveness of the message. In an experimental study using an organ donation-related narrative, Bea (2008) found that emotional information that elicited sympathy and empathy increased intention to sign a cornea donor card. Further, Dunlop and colleagues found that experiencing emotion is associated with increased message persuasiveness (Dunlop, Wakefield, & Kishima, 2008). Indeed, a number of scholars have found a relationship between the presence of emotional information in narratives, identification, empathy, and persuasive outcomes associated with narrative (e.g., Green & Brock, 2000).

Sequence LC4MP—Information that is temporally sequenced should more easily activate schemas and therefore be easier to process. There are a number of examples of sequence improving processing. Lang (1989) found that subjects were more successful on a cued-recall task for stories that were chronologically sequenced than stories that were not. In a functional magnetic resonance imaging (fMRI) study that included reaction time data, Ferstl, Rinck, and von Cramon (2005) found subjects were sensitive to violations of temporal sequencing and noticed these changes more quickly than violations of emotional causality, suggesting that temporal sequencing may be particularly important in story processing. Thus, information that is sequential may activate associated schemas, thereby increasing informational accessibility and decreasing cognitive load.

Sequence E-ELM—Though it seems likely that information that is sequential may be more involving and could produce greater identification or empathy, there is little empirical evidence in this regard. However, scholars (e.g., Green, 2008) suggest that sequential information is inherent to narratives and thus plays a role in producing narrative effects.

Context LC4MP—Context refers to information about the characters and the world in which the story takes place. Contextual information is generally studied in two ways in terms of memory. The first is schematic knowledge; the second is background knowledge of the textual processor. Schematic knowledge, a general script about how the story should go or how pieces of the story should be related (e.g., McDaniel, Hines, Waddill, & Eistein, 1994), has been shown to improve cued recall. McDaniel and colleagues (1994) found that asking subjects to reorder stories sequentially improved cued recall generally—except in the case of folk tales. McDaniel and colleagues (1994) suggest this exception may be due to background knowledge, schemas, or what they call superstructures. “*Superstructure* refers to readers’ knowledge of the canonical structure of particular text types” (McDaniel Hines, Waddill, & Eistein, 1994, p. 172), which may be related to previous context associated with folk tales. In addition, contextual information about characters may improve reading comprehension in children (Kucer, 2010), and teaching children about narrative schemas improves text comprehension (Stevens, VanMeter, & Warcholak, 2010).

Background knowledge also has an effect as a source of context. Some studies find that subjects who have greater background knowledge recall information more effectively (e.g., Marmolejo-Ramos, de Juan, Gyga, Mada, & Roa, 2009); however, this is not always the case. O’Reilly and McNamara (2007) find evidence supporting previous findings that experts actually benefit from less contextual information and experience a processing decrement when too much additional information is available whereas low-expertise individuals benefit from additional contextual information in place of background knowledge (O’Reilly & McNamara, 2007). This article will focus on context as the amount of character or event-related information included in the story.

Contextual information may activate schemas and thus reduce cognitive load or increase resource allocation due to novelty, thereby increasing encoding. However, additional contextual information may be distracting and therefore encoding may actually decrease.

Context E-ELM—The process through which context may affect processing through E-ELM is also unclear. It is certainly possible that contextual information may increase engagement, identification or empathy. For example, higher levels of character identification were associated with increased perceived safe alcohol use message persuasiveness in a college student population (Andsager, Bemker, Choi, & Torwel, 2006).

The same process may occur with tailored information. Rimer and Kreuter (2006) argue that behavior/attitude change occurs because tailored messages increase motivation to process information. Tailored messages induce a specific pattern of neurological activation and may be more effective due to this pattern. Tailored messages activate the rMPFC (rostral medial prefrontal cortex) and precuneus/posterior cingulate regions of the brain (Chua, Liberzon, Welsh, & Strecher, 2009), and these parts of the brain are associated with recall of episodic

and personal traits associated with similar situations and also with intention to engage in a behavior (Chua Liberzon, Welsh, & Strecher, 2009).

However, contextual information may also reduce persuasiveness because identification or empathy may increase scrutiny of the narrative-like information (e.g., Slater & Rouner, 2002). If this occurs, and the contextual information is distracting or objectionable, that may reduce persuasiveness.

Hypotheses and Research Questions

Research has suggested that transportation would predict agreement with story-relevant beliefs (e.g., Green & Brock, 2000). However, there is no literature on the relationship between narrative structural features and agreement with story-relevant beliefs.

H₁. Transportation will predict agreement with story-relevant beliefs.

RQ₁. Will narrative structural feature scales predict agreement with story-relevant beliefs?

Narrative structural features were chosen to increase resource allocation. Further, if transportation serves as proxy for narrative engagement, subjects should more actively encode a message if they are more transported. Thus, the following hypothesis was proposed:

H₂. Higher levels of transportation and narrative structural features will improve encoding, operationalized as forced-choice recognition.

There is a positive relationship between narratives more generally and persuasion outcomes (e.g., Green & Brock, 2000). However, there is no literature on the relationship between narrative structural features themselves and persuasion outcomes—one of which is intention to quit smoking.

RQ₂. Do narrative structural features or transportation significantly predict intention to quit smoking?

Finally, since encoding should precede persuasion, it seems likely that messages must be successfully encoded in order to be persuasive.

H₃: Encoding will be correlated with agreement with story-relevant beliefs and intention-to-quit smoking.

METHODS

Design

Stimuli were comprised of different news articles, one for each condition, about a fictional smoker as she attempted to quit smoking. This experiment was part of a larger experiment with a 3 (cessation aids) × 2 (genetic vs. general threat) × 2 (exemplar vs. nonexemplar) study design. A 13th condition, in which there was no story, served as a control condition. All articles were roughly equivalent in length and reading difficulty. The stimuli were not overly arousing or very strongly valenced, and therefore seemed unlikely to produce information overload.

Participants

In October and November 2008, 1,312 (the 93 subjects from the control group were dropped ($N_{\text{kept in study}} = 1,219$) adult smokers completed an online survey that involved reading news stories about quitting smoking. Participants were part of a Knowledge Networks online panel, which has been used extensively by communication scholars to recruit adults in a nationally representative sample in the United States (Kim, Bigman, Leader, Lerman, & Cappella, 2012). Participants are recruited via random digit dialing and are provided with computer equipment to complete online surveys if they do not currently have that ability. To ensure that participants were current and regular smokers, inclusion criteria based on survey responses were the following: (a) currently smoking cigarettes, (b) have smoked an average of 5 or more cigarettes a day in the past week, and (c) have smoked at least 100 cigarettes in their lifetime. The panel recruitment rate was 66.3% and the percent that qualified for inclusion was 16.1%.

Roughly half of subjects were currently married, 76% were White, 8% were Black, 6% were Hispanic, and the rest were either mixed race or other. Males accounted for 48% of the subjects. Sixteen percent had not completed high school, 38% completed high school but no college, and the remaining 46% had a post-high school coursework.

Procedure

Participants first responded to questions related to their smoking and family history of smoking, their degree of addiction to cigarettes, and other smoking-related items, followed by an additional battery of questions. Participants were then randomized to a condition. After reading the news story, participants were asked to rate the messages for transportation and narrative structural features, as well as a series of other message-related questions. News stories were roughly a half a page in length and, though they were about slightly different characters, contained intentionally similar content about characters attempting to quit smoking using various quit methods such as nicotine replacement therapy. The exemplar-related stories intentionally included more emotional content, but otherwise differences in the messages were based on the perception of the reader and unmanipulated differences in the messages.

Independent Variables

Narrative structural features, transportation, and emotion items were rated on a 7-point scale from *strongly agree* to *strongly disagree*. The stem for the emotion items was “I felt” followed by an emotion (e.g., happy, proud, guilty). Emotions were clustered into two groups, positive emotion (happy and proud) and negative emotion (guilty and sad). Items were averaged across positive emotion (mean = 2.84, $SD = .65$, range = 0.67–5.00) and negative emotion (mean = 2.98, $SD = .82$, range = 0.50–5.00). A 5-item shortened transportation scale was used to reduce time and cognitive burden on the subjects as has been used in previous studies (Kim, Bigman, Leader, Lerman, & Cappella, 2012). Sample items included in the transportation scale were “The events in the story are relevant to my everyday life” and “I could picture myself in the scene of the events in the story.” Transportation items were averaged (mean = 3.47, $SD = .60$, range = 1.33–5.83). Sequence (3 items) addressed the connectedness and time ordering of the story, for example, “The

parts of the story followed one another in a clear sequence.” Sequence items were averaged (mean = 3.57, $SD = .59$, range = 0.33–5.00). Arousal was measured using “The story I just read was boring” and “The story was predictable.” Arousal items were averaged (mean = 3.05, $SD = .68$, range = 1.00–5.00). Context was measured using two items, for example, “In the story I just read, there was a lot of information about who the characters were and where they came from.” Context items were averaged (mean = 2.65, $SD = .65$, range = 0–5.00).

Dependent Variables

To prevent priming, three belief items related to the effects of smoking cessation were given post test. These were “I would have more energy,” “I would reduce my chances of getting a serious illness, such as lung cancer or heart disease,” and “I would make others close to me happy.”¹

Encoding was operationalized using 12 forced-choice recognition questions designed to test memory for specific facts from each message. Percent correct was used as the dependent variable in all recognition analyses.²

Intention to quit was operationalized using two questions: “How likely is it that you will TRY TO QUIT smoking completely and permanently in the next 3 months?” and “How likely is it that you WILL QUIT smoking completely and permanently in the next 3 months?” These questions were significantly correlated ($\tau = .77, p < .01$) using Kendal’s τ -b. Items were summed to create a scale.

Covariates and Other Items

Smoking addiction was operationalized using the 6-item FTND Scale created by Heatherton, Kozlowski, Frecker, and Fagerstrom (1991; mean = 4.48, $SD = 2.25$, range = 0–10). SOC was operationalized using the following prompt, “Choose the number that indicates where **you are now at** in thinking about quitting smoking.” Responses are scored on 0–10 scales with 0 being *I have no thoughts about quitting smoking* and 10 being *I am taking action to quit smoking* (mean = 5.55, $SD = 2.85$, range = 0–10; DiClemente et al., 1991).

EXPLORATORY FACTOR ANALYSIS FOR NARRATIVE STRUCTURAL FEATURE ITEMS AND TRANSPORTATION

Principle component analysis with Varimax rotation³ produced five factors with eigenvalues > 1 explaining 60.54% of the variance. Results for the rotated factor analysis, suggesting a 5-factor solution, are presented in Table 1. The five eigenvalues associated with these factors in decreasing order were 4.75, 2.05, 1.63, 1.63, and 1.28, and the factors will be henceforth called factors 1 (Transportation), 2 (Sequence), 3 (Negative Emotion), 4

¹There were three other belief items that were not directly related to the story, “I would gain weight,” “I would be more irritable,” and “I would be a pain to be around.”

²There were no clear ceiling or floor effects for any of the 12 questions. There was also a “don’t know” option that was treated as incorrect for the purpose of this analysis.

³Varimax rotation was chosen because it is the most common form of factor analysis for social scientists and describes the greatest possible level of variance (Tabachnick & Fidell, 2007). Further, this may provide more easily interpretable results than other types of factor analytic methods.

(Positive Emotion), and 5 (Context), respectively. Correlations between factors can be found in Table 2.

Arousal and anger were dropped from the remainder of the analyses due to poor reliability (arousal) or ambivalent factor loadings (anger). Cronbach's alphas for all narrative structural features and transportation based on the factor analysis can be found in Table 1.

Since this research describes the development of a series of new narrative structural feature scales, it is important to begin to establish validity of these scales. Transportation is a frequently utilized measure of narrativity or narrative engagement. An association between the narrative structural features being developed for this article and transportation would suggest convergent validity. All narrative structural feature scales are moderately correlated with transportation (between .10 and .45), with the emotion scales demonstrating the strongest correlation with transportation (Table 2).

BOOTSTRAP FOR NARRATIVE STRUCTURAL FEATURE ITEMS AND TRANSPORTATION

A bootstrap analysis was completed to compare responses of subjects who were exposed to each condition for each of the structural feature items (including positive and negative emotion) in order to address the possible concern that the emotion items were not measuring something that was structural in nature. The purpose of this bootstrap analysis is to understand which structural feature measures have the largest and smallest standard deviations. A truly structural measure would have a low standard deviation because there would be very little disagreement about the appropriate value (Hayes, 2009). Generally, most narrative structural features, transportation, identification, and empathy measures have virtually equivalent standard deviations (between .06 and .11). Guilt does appear to have a relatively higher standard deviation than any other measure, except perhaps transportation 1 (both are roughly .10). The sequence questions appear to have lower standard deviations (closer to .065) than the other measures. However, the majority of the confidence intervals overlap. This would suggest that the emotion items are functioning in a similar manner to the other structural feature variables and may be treated as structural.

AGREEMENT WITH STORY-RELEVANT BELIEFS RESULTS

RQ₁ asked whether any rated narrative structural features measures significantly predicted agreement with story-relevant beliefs. Hypothesis 1 predicted that transportation would be positively related to story-relevant beliefs.

A MANOVA analysis was completed to compare the effect of narrative structural features, transportation and covariates on individual beliefs and beliefs overall. FTND and SOC were included as covariates in the model. Following this, regressions were completed for each of the three story-relevant beliefs questions ("I would have more energy," "I would reduce my chances of getting a serious illness," and "I would make others close to me happy"). Both the MANOVA and the regression results are being presented because they provide different types of information. The MANOVA describes the overall effect of the predictor variables

across story-relevant beliefs, whereas the regressions describe the unique contribution of each of the predictor variables to each belief separately.

For the overall results including all three beliefs, there was a main effect of Transportation, $F(75, 3306) = 1.80, p < .001, \eta_p^2 = .04$, and SOC $F(3, 1100) = 3.00, p < .001, \eta_p^2 = .05$. There were no other significant effects.

Regression results can be found in Table 3. Typically, across story-relevant belief questions, there are significant positive effects of sequence on story-relevant beliefs and there are negative effects of context. Transportation is positively and significantly associated with agreement with “reducing changes of getting a serious illness,” and marginally significantly associated with “making others happy,” but not significantly associated with a belief that an individual will “have more energy.” Negative emotion significantly and positively predicted agreement with “have more energy.” Being high in SOC was strongly and significantly associated with agreement across story-relevant beliefs.

RECOGNITION RESULTS

H₂ predicted that narrative structural features and transportation would increase recognition memory. The dependent variable for the linear regression recognition analysis was a percent correct variable with percent correct on all 12 recognition items ranging from 0% to 100% (mean = 59.77%, $SD = 21.42\%$). The independent variables were created by averaging values for each scale across person. Results can be found in Table 4.

Results indicated a significant positive relationship between transportation and sequence and recognition memory and a significant negative relationship between negative emotion and context and recognition memory. There were no significant effects for positive emotion, FTND, or SOC.

INTENTION TO QUIT RESULTS

RQ₂ asked about the effect of narrative structural features and transportation on intention to quit smoking. Structural features, transportation, and individual differences (SOC and FTND) were treated as predictor variables in a linear regression with intention to quit scale as the dependent variable. Results can be found in Table 5. When transportation, positive emotion, or negative emotion was higher, subjects had greater intention to quit. When subjects were higher on SOC, they had a greater intention to quit. When subjects were higher in FTND, they had a lower intention to quit. There were no significant effects of sequence or context.

RECOGNITION, STORY-RELEVANT BELIEFS, AND INTENTION TO QUIT

H₃ suggested that encoding should be correlated with agreement with story-relevant beliefs and intention to quit smoking. The correlation between percent correct and agreement with story-relevant beliefs was .14 ($p < .001$) and the correlation between percent and intention to quit was .07 ($p < .001$). The correlation between intention to quit and story-relevant beliefs was .28 ($p < .001$).

SUMMARY OF RESULTS

Results suggested little relationship between intention to quit, agreement with story-relevant beliefs, and recognition for narrative structural features. Results for each narrative structural feature and transportation across analyses are summarized in Table 6. Transportation was significantly and positively associated with recognition, agreement with story-relevant beliefs, and intention to quit. However, the significant and positive association between transportation and agreement with story-relevant beliefs may have been a result of the strong relationship between transportation and “reducing changes of getting a serious illness.” Positive emotion was positively associated with intention to quit but was negatively associated with recognition memory. Negative emotion was positively associated with intention to quit but is negatively associated with recognition and had a significant association with agreement with “have more energy.” Sequence and context significantly predicted memory: specifically, with greater levels of sequence being associated with increased recognition memory and lower levels of context significantly predicting recognition memory. Though neither sequence nor context appeared to significantly contribute to the model containing all three story-relevant beliefs, both sequence and context were significantly associated with greater agreement with all story-relevant beliefs. There were no other significant effects for these measures.

Being closer to a quit attempt on the SOC scale was associated with increased agreement with story-relevant beliefs, increased intention to quit, and increased recognition memory. Having a higher score on FTND was associated with decreased intention to quit, but had no other significant effects.

DISCUSSION

These results give preliminary support to the notion that the narrative structural feature scales developed for this research demonstrate a degree of validity and reliability. The scales that were retained for analysis displayed adequate reliability (Cronbach’s α and Kendal’s τ -b). In addition, they were moderately correlated with transportation and were associated with outcomes historically associated with narratives in the literature, namely, memory for stories and persuasion.

Further, this research suggests two important takeaways about narratives: (1) Our understanding of narratives as a class of messages may be inadequately specific—that is, messages may contain some narrative structural features but not others; and (2) transportation is at least partially distinct from some aspects of narrative structure, though it is strongly related to emotion, and messages that induce high levels of rated transportation may be more effective across metrics.

Sequence and context are the two factors that may be likely to be objectively manipulated. Though these narrative structural features have no significant effect on persuasion outcomes overall, sequence was significantly associated with agreement with each of the story-relevant beliefs in individual regressions, and context was negatively associated with agreement with story-relevant beliefs in all of the regression models. Too much contextual

information was also associated with decreased recognition memory. This may suggest that too much information is distracting, which may be caused by subject-area expertise about smoking (O'Reilly & McNamara, 2007), information overload, boredom, or perhaps restriction of focus to only peripheral information in the message. Future work on context needs to examine reaction times or some other more precise resource allocation measure in order to describe what amount of cognitive load is elicited by particular amounts of contextual information. This is particularly important because contextual information about characters and the environment is so essential to narratives.

In the context of health communication interventions, goals matter. The relationship between memory and agreement with story-relevant beliefs and memory and intention to quit is minimal. Though this is not what was initially predicted, it is not a wholly unexpected finding given some of the literature. For example, in an fMRI study of smokers exposed to smoking cessation information, messages that were more highly tailored were better remembered but performance on memory tasks was not significantly related to quitting (Chua et al., 2011).

If message designers are interested in developing memorable messages, messages should be sequential without too much contextual or emotional information, but if message designers are interested in developing persuasive messages, inducing all emotions except anger increases persuasion at the price of a lessened effect from context or sequence.

This study was a part of a larger research project. The emotion items used for this study were not optimal as they referenced the experience of the individual processing the message and not the message itself. It would have been better if they read “the information in this story is sad,” “the story contains information that might make a person feel sad,” or “the story is sad,” for example. Future research should explore alternative emotion items either based on Lang’s LC4MP (2006), such as “the story contains positive emotion,” “this story contains negative emotion,” or another approach that focuses on discrete emotion items (Nabi, 2010). Further, additional arousal-related items should also be tested in this context, such as “this story is arousing.”

In addition, it is worth noting that the measures of narrative structure used in this study were rated as opposed to coded. Thus, these results relate to perceived narrativity as opposed to a more objective measure. However, this is an important first step in understanding the relationship between measures of narrative structure and memory and persuasion outcomes. Additionally, more complete story-relevant belief items need to be included, particularly items that are negatively valenced. Finally, behavioral outcomes, as opposed to intentions to engage in a behavior, should be included in future studies.

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TABLE 1

Factor Analysis of Structural Feature Items for Study 1

	Factor				
	1	2	3	4	5
<i>(Original Theoretical Construct: Instrument Items)</i>					
A1: The story I just read was boring.	-.77				.63
T3: After I finished reading the story, I found it easy to put it out of my mind.	-.71				.52
T2: I was mentally involved in the story while reading it.	.58	.38	.25		.56
T1: I could picture myself in the scene of the events in the story.	.57	.31	.30		.52
T4: The events in the story are relevant to my everyday life.	.53	.24	.35		.46
T5: The story was so clear to me that I knew its smell, touch, and "feel".	.49	.21	.31	.26	.46
T6: I had trouble visualizing the persons and places described in the story.	-.50	-.26	.25	.27	.47
A2: <i>The story I just read was predictable.</i>	-.49	.50			.56
S1: The story I just read had a series of connected events.		.70			.59
S2: The pieces of the story I just read fit together nicely.	.29	.74			.67
S3: The parts of the story followed one another in a clear sequence.		.80			.67
E1: I felt guilty.			.76		.63
E2: I felt angry.	-.24		.71		.60
E4: I felt sad.			.75		.61
E5: I felt happy.				.88	.77
E6: I felt proud.				.86	.75
E3: <i>I felt hopeful.</i>	.47			.56	.59
C1: In the story I just read, there was a lot of information about who the characters were and where they came from.					.82
C2: In the story I just read, there was a lot of information about the world in which the story took place.					.83
Cronbach's α by factor	.79	.78	.68	.76	.68
Scale mean by factor	2.96	3.56	2.60	2.64	2.96
Scale max by factor	3.60	3.63	3.00	2.70	2.97
Scale min by factor	3.23	3.59	2.86	2.67	2.96

Note. Loadings below .20 are not printed. T = Transportation, S = Sequence, C = Context, PE = Positive emotion, PN = Negative emotion, A = Arousal, AN = Anger. Variables in *italics* were dropped from factors due to ambiguous factor loading. Only items that were not dropped by factor analysis were included in the Cronbach's α . Factor 1 included one arousal item and transportation and thus was called "Transportation." Factor 2 included sequence and chronology items and thus was called "Sequence." Factor 3 included feelings of guilt, anger, and sadness and thus was called "Negative Emotion." Factor 4 included happy and proud and thus was called "Positive Emotion." Factor 5 included context items and thus was called "Context." h^2 indicated communality estimates.

TABLE 2

Correlations Between Factors

	<i>Transportation</i>	<i>Sequence</i>	<i>Negative Emotion</i>	<i>Positive Emotion</i>
Sequence	.45**			
Negative emotion	.26***	.10***		
Positive emotion	.10***	.07*	.14***	
Context	.22***	.32***	.14***	.17***

Note. In order to calculate the correlations between factors, intrafactor measures were averaged for each factor.

⁺
p .10.

*
p .05.

**
p .01.

p .001.

TABLE 3

Regressions for Story-Relevant Belief Items With Transportation, Narrative Structural Features, and Individual Differences Predicting Beliefs

<i>Structural Measure</i>	<i>B</i>	<i>SEB</i>	<i>β</i>	<i>t</i>	<i>p Value</i>
Have more energy					
Intercept	1.83	.24		7.78	<.001
Transportation	.07	.05	.04	1.35	.178
Sequence	.42	.06	.25	7.46	<.001
Context	-.16	.04	-.10	-3.51	<.001
Negative emotion	.13	.04	.09	2.98	.003
Positive emotion	-.03	.06	-.02	-.53	.599
Fagerstrom	.05	.05	.02	.86	.390
SOC	.07	.01	.20	7.15	<.001
Reduces chances of serious illness					
Intercept	2.24	.22	10.30	<.001	
Transportation	.21	.05	.14	4.66	<.001
Sequence	.32	.05	.21	6.19	<.001
Context	-.12	.04	-.09	-2.97	.003
Negative emotion	.05	.04	.04	1.34	.181
Positive emotion	.00	.06	.00	-.05	.958
Fagerstrom	-.05	.05	-.03	-.91	.363
SOC	.05	.01	.14	4.96	<.001
Make others happy					
Intercept	2.55	.26	9.71	<.001	
Transportation	.10	.05	.05	1.75	.080
Sequence	.27	.06	.15	4.29	<.001
Context	-.16	.05	-.10	-3.15	.002
Negative emotion	.04	.05	.03	.91	.365
Positive emotion	.03	.07	.01	.37	.710
Fagerstrom	.03	.06	.02	.57	.571
SOC	.07	.01	.20	6.76	<.001

TABLE 4
Structural Features, Transportation, and Covariates Predicting Percent Correct for Total Recognition

<i>Structural Measure</i>	<i>B</i>	<i>SEB</i>	<i>β</i>	<i>t</i>	<i>p Value</i>
Intercept	.53	.05	10.30	<.001	
Transportation	.03	.01	.07	1.97	.049
Sequence	.08	.01	.22	7.33	<.001
Context	-.07	.01	-.21	-6.70	<.001
Negative emotion	-.03	.01	-.10	-3.19	.001
Positive emotion	-.02	.01	-.07	-2.19	.029
Fagerstrom	-.004	.003	-.04	-1.43	.153
SOC	.004	.002	.05	1.74	.083

Note. There was no significant collinearity between any of the variables in this model.

TABLE 5
Structural Features, Transportation, and Covariates Predicting Intention to Quit

<i>Structural Measure</i>	<i>B</i>	<i>SEB</i>	β	<i>t</i>	<i>p Value</i>
Intercept	.93	.38		2.42	.015
Transportation	.53	.10	.15	5.34	<.001
Sequence	-.08	.08	-.02	-.98	.329
Context	-.02	.08	-.01	-.28	.777
Negative emotion	.13	.06	.05	2.21	.027
Positive emotion	.34	.07	.11	4.79	<.001
Fagerstrom	-.08	.02	-.08	-3.69	<.001
SOC	.39	.02	.54	23.30	<.001

Note. There was no significant collinearity between any of the variables in this model.

TABLE 6

Summary Table of Findings

<i>Structural Measure</i>	<i>Agree With Beliefs</i>	<i>Intention to Quit</i>	<i>Recognition</i>
Sequence	*	*	+
Transportation	+	+	+
Context	*	*	–
Negative emotion	*	+	–
Positive emotion	*	+	–

Note. + Indicates a positive relationship – indicates a negative relationship, and * indicates no significant effect.