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Prev Med. 2018 June ; 111: 284–290. doi:10.1016/j.ypmed.2017.11.014.**The relative persuasiveness of narrative versus non-narrative health messages in public health emergency communication: Evidence from a field experiment****Mesfin A. Bekalu^{a,*}, Cabral A. Bigman^b, Rachel F. McCloud^a, Leesa K. Lin^a, and K. Viswanath^a**^aHarvard T.H. Chan School of Public Health, 450 Brookline Avenue, LW 601, Boston, MA 02215, United States^bDepartment of Communication, University of Illinois at Urbana-Champaign, USA**Abstract**

Previous studies indicated that narrative health messages are more effective than non-narrative messages in influencing health outcomes. However, this body of evidence does not account for differences in health domain, and little is known about the effectiveness of this message execution strategy during public health emergencies. In this study, we examined the relative effectiveness of the two formats in influencing knowledge and perceived response efficacy related to prevention of pandemic influenza, and determined whether effects of message format vary across population sub-groups. Data for the study come from an experiment fielded in 2013 that involved a nationally representative sample of 627 American adults. Participants were randomly assigned to view either a narrative ($n = 322$) or a non-narrative ($n = 305$) video clip containing closely matched information about knowledge and preventive actions related to pandemic influenza, and completed pre- and post-viewing questions assessing knowledge and perceived response efficacy related to the prevention of pandemic influenza. Results indicated that participants in the non-narrative condition reported greater knowledge and rated pandemic influenza prevention measures as more effective compared with those in the narrative condition. Message format effects did not vary across population sub-groups; post-viewing scores of knowledge and perceptions related to pandemic influenza were consistently higher in the non-narrative condition compared with the narrative condition across five socio-demographic groups: age, gender, education, race/ethnicity and income. We concluded that didactic, non-narrative messages may be more effective than narrative messages to influence knowledge and perceptions during public health emergencies.

Keywords

Message tactics; Public health emergency communication; Narrative vs. non-narrative formats

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Conflict of interest statement

We have no conflict of interest.

IRB approval

IRB approval for the study was obtained from the Institutional Review Board of Harvard T.H. School of Public Health.

1. Introduction

Public health communication is one of the more important tools of achieving public health objectives by influencing health behaviors related to both communicable and non-communicable diseases (Bernhardt, 2004; Maibach and Parrott, 1995). The effectiveness of a given public health communication program heavily relies on designing the right health messages in the right formats that resonate with the target audience (Bekalu and Eggermont, 2014; Keller and Lehmann, 2008). Designing effective messages has long been the subject of much research and theorizing in public health communication.

A variety of message formats have been investigated for their effectiveness on different health outcomes (Viswanath and Emmons, 2006). Among the formats, research suggests that compared with the more traditional didactic or factual message format, a narrative format might be more persuasive (Murphy et al., 2015; Hinyard and Kreuter, 2007; Kreuter et al., 2010). While there is no single definition of narrative universally accepted by researchers, drawing on themes and concepts that are recurrently used by researchers to describe the term, Kreuter and colleagues define narrative communication 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., 2007:222). Put simply, “a message may be called a narrative if it is a story that contains information about setting, characters, and their motivations”(Braddock and Dillard, 2016:1). Narrative communication can take different forms: entertainment-education, journalism, literature, testimonials, and story-telling (Kreuter et al., 2007). Specifically, in the context of public health communication, researchers have identified five major forms of narratives: “official stories constructed to tell an innocuous version of events or the position of a group, invented stories that are made up or fictional, *firsthand experiential stories*, *secondhand stories* of others that we retell, and *culturally common stories* that are generalized and pervasive in a cultural environment”(Hinyard and Kreuter, 2007). The theoretical rationale behind the use of one or the other forms of narrative communication can be summarized in terms of four widely cited notions: transportation, identification, parasocial interaction and emotion (Moyer-Guse, 2008; Moyer-Guse and Nabi, 2010; Murphy et al., 2013).

It is reasoned that compared to individuals exposed to messages in a non-narrative format, those exposed to messages in a narrative format would be drawn into the story and/or transported from the real-world into the narrative world, and to the extent they do so, they are likely to show effects of the story on their real-world beliefs (Green and Brock, 2000; Murphy et al., 2013). It is also argued that audiences exposed to narratives might identify with story characters, through perceived similarity and wishful identification, and that enhances messages’ personal relevance and help overcome perceptions of invulnerability (Frank et al., 2015; Murphy et al., 2013). Drawing on Horton and Wohl’s (1956) notion of parasocial interaction, research on narrative persuasion has also shown that individuals exposed to narratives may engage in a “seeming face-to-face relationship” with story characters that leads to the creation of a unidirectional viewer-character bond which in turn might reduce reactance to message and enhance persuasive effects (Moyer-Guse, 2008; Moyer-Guse and Nabi, 2010). Narratives are also theorized to work through emotion (Murphy et al., 2013). Compared with non-narrative messages, narrative messages have the

potential to evoke different emotions; and messages that elicit emotional responses are more likely to engender interpersonal conversations through the activation of interpersonal networks that improve message recall (McQueen et al., 2011; Myrick, 2015; Ramanadhan et al., 2017).

The argument for the use of narratives holds that due to *transportation, identification with characters, parasocial interaction and activation of emotions*, messages in a narrative format can result in positive health outcomes as they may reduce resistance and facilitate processing of new and/or difficult information (Murphy et al., 2013). A considerable body of research in health communication has provided empirical support for these propositions in promoting cancer-related outcomes such as HPV vaccine utilization and undergoing cervical and skin cancer screening (Moran et al., 2013; Lemal and Van den Bulck, 2010; Borrayo et al., 2016; Stavrositu and Kim, 2014; Murphy et al., 2015; Frank et al., 2015).

Research also suggests that the relative persuasiveness of narrative and non-narrative formats depends on different factors related to the targeted audience and the specific health behavior being promoted. For example, a study among college students found that in processing alcohol education messages, individuals rated statistical evidence, a form of non-narrative message, as more persuasive when the message was congruent with their values, but narrative evidence as more persuasive when the message was not congruent (counter-attitudinal) with their values (Slater and Rouner, 1996). Additionally, a recent meta-analysis found that statistical evidence had a stronger influence than narrative evidence on beliefs and attitudes, whereas narrative evidence had a stronger influence on intention, suggesting the importance of the match between the specific characteristics of the two formats of message and those of the outcome (Zebregs et al., 2014).

The available theoretical and empirical literature on the relative effectiveness of the two formats suggests the need for further research. Researchers (Kreuter et al., 2007; Green, 2006) have noted that narratives may be particularly useful for conveying cancer information in that such formats reduce counterarguments and thereby help individuals overcome barriers to screening and treatment seeking. It has been argued that narratives should enhance persuasive effects and suppress counterarguing (through transportation and identification) if the implicit persuasive content is counterattitudinal (Slater and Rouner, 2002). However, existing evidence on narrative persuasion does not account for differences in health domain, and whether the relative persuasiveness of this format of communication holds in health domains such as public health emergencies is largely unknown. During public health emergencies, public health professionals seek to encourage the public to engage in preventive behaviors against some imminent threats. In such a context, individuals are less likely to have the time to engage in the kind of message processing that subtler formats such as narratives require. Additionally, messages in emergency contexts promote the adoption of prevention behaviors as opposed to messages that promote the adoption of detection behaviors such as cancer screening. Because prevention behaviors might generally be expected to be less counterattitudinal than detection behaviors, whether narrative or non-narrative formats become more persuasive during emergency preparedness contexts becomes an empirical question.

In this study, we sought to address this question. We examined the relative persuasiveness of narrative and non-narrative message formats in the context of public health emergency communication. During public health emergencies, public health professionals engage in a variety of communication efforts to inform the public, encourage the adoption of preventive actions and thereby limit the impact of adverse events (Savoia et al., 2013). However, despite the centrality of effective communications during a public health crisis, little is known about the most effective message tactics in general and the relative merits of the widely studied narrative versus non-narrative messages in particular (Savoia et al., 2013). In this study, our focus has been on testing the relative persuasiveness of the two formats in changing knowledge and perceived response efficacy related to prevention of pandemic influenza, a rare but recurrent public health problem (WHO, 2005). Because the primary goal of information campaigns during public health emergencies is to raise public awareness about an immediate threat and to recommend a set of preventive measures for the public to adopt, our focus has been on cognitive (knowledge and perceptions) outcomes. Moreover, within the framework of communication inequalities and health disparities (Viswanath et al., 2007), research has shown that there are consistent associations between socio-demographic factors and public health emergency communication and preparedness outcomes (Savoia et al., 2013). For example, a systematic review by Savoia et al. (2013) found that men, young adults, and people from minority and low socioeconomic groups tend to fail to follow recommended preventive measures during public health emergency. We therefore sought to examine if effects of message format vary across audiences of different socio-demographic groups - age, gender, race/ethnicity, education and income.

2. Methods

2.1. Materials

To empirically test whether a narrative or non-narrative message format is more effective in changing knowledge and perceived response efficacy related to prevention of pandemic influenza, we produced two 4-min video clips from a reputable publicly available source, *the American Red Cross YouTube channel*, and the movie *Contagion*. First, we identified three informational H1N1 Virus (2009) videos from the Red Cross; each presented facts about pandemic influenza in a question-and-answer format and had a well-defined objective: *learn the facts about H1N1 influenza, learn how the influenza virus spreads, and learn flu prevention strategies*. The three Red Cross videos were reviewed for themes and edited to create a 4-min clip. The Red Cross themes were then matched to scenes in the movie *Contagion* by two coders, who created an exhaustive list of scenes which, through spoken (e.g., a conversation between two characters) or visual (e.g., a visual compilation of scenes) depictions, corresponded with the facts presented in the Red Cross clip. Next, the retained *Contagion* clips were edited for sequence to create a coherent narrative. The final edited *Contagion* cut began with the first moment of transmission of the pandemic influenza virus from animal to human, and proceeded chronologically to illustrate the impact of the pandemic as the disease spread. The Red Cross and *Contagion* clips on each theme were then viewed scene-by-scene by a panel of study staff and were evaluated on the extent to which the scenes in both clips conveyed the same message. The final themes for inclusion in

each video were: *facts about influenza, how the influenza virus spreads, and flu prevention strategies*. Fig. 1 shows still shots from each video clip.

2.2. Sample and procedure

Data for the study come from a nationally representative sample of 627 American adults recruited by Knowledge Networks (KN) as part of their Internet panel. The KN panel was created by combining random digit dialing (RDD) and address-based sampling (ABS) methods. The combination of these two methods of creating the panel helps overcome the problems associated with cell phone penetration that plague many RDD surveys. All study participants either have or are given Internet access by KN. This allowed the sample to be more representative than regular voluntary Internet samples. Participants were eligible for the study if they were adult (18 years or older), have not completed other public health emergency surveys, have not seen the movie *Contagion* in the past year, and spoke English. The experiment was fielded in 2013 and began with a preliminary screening of participants that lasted about one minute to determine eligibility. Participants were then randomly assigned to view either the narrative (Contagion) format ($n = 322$) or the non-narrative (Red Cross) format ($n = 305$), and were asked to complete pre- and post-viewing questions assessing knowledge and perceived response efficacy related to prevention of pandemic influenza.

2.3. Measures

2.3.1. Socio-demographic variables—Participants provided data on gender (male = 44.3%, female = 55.7%), age (18–29 = 20.7%, 30–44 = 27.8%, 45–59 = 29.8%, 60 + = 21.7%), race/ethnicity (White, non-Hispanic = 28.9%, Black, non-Hispanic = 38.3%, Hispanic = 32.9%), education (less than high school = 16.1%, high school = 31.9%, some college = 32.2%, bachelor’s or above = 19.8%), and income (less than \$10,000 = 24.2%, \$10,000 to \$24,999 = 30.6%, \$25,000 to \$50,000 = 16.7%, \$50,000 + = 28.4%).

2.3.2. Knowledge of pandemic influenza—Both video clips included information about pandemic influenza, such as what pandemic influenza is, how it is transmitted, and who is at risk of catching it. Knowledge of Pandemic Influenza was assessed using 10 knowledge items in a “True” or “False” format at both pretest and posttest. Example questions include, “Pandemic influenza is a new virus”, “Pandemic influenza does not affect healthy adults”, and “Pandemic influenza is transmitted through direct contact with a sick person”. Knowledge scores were the number of correct answers out of 10.

2.3.3. Response efficacy—Both videos included information related to a set of actions that the public needs to take in order to prevent the spread of pandemic influenza. The information was adapted from CDC’s recommendations to prevent the spread of H1N1 flu in 2009. Response Efficacy was assessed at both pretest and posttest using a six item seven-point Likert-type scale anchored at 1 = *not at all effective* to 7 = *extremely effective*. Participants were asked how effective, for example, “washing hands frequently”, “staying home when sick” and “avoiding unnecessary travel” were in preventing the spread of pandemic influenza. The mean of the six items served as a pretest (Cronbach’s $\alpha = 0.88$) and posttest (Cronbach’s $\alpha = 0.93$) scores of Response Efficacy.

2.4. Analysis

Preliminary analyses were conducted using independent samples *t*-tests to ensure that participants in the two treatment conditions were similar. Then, analyses of covariance using two univariate general linear models were performed to determine the main and interaction effects of video format manipulation on the two outcome variables - Knowledge of Pandemic Influenza and Response Efficacy. In both models, Narrative versus Non-Narrative Format, Age, Gender, Education, Race/Ethnicity, and Income were entered as independent variables. Pretest scores of Knowledge of Pandemic Influenza and Response Efficacy were entered as covariates in each of the respective models. The models also included five interaction terms: Narrative versus Non-Narrative Format by Age, Narrative versus Non-Narrative Format by Gender, Narrative versus Non-Narrative Format by Race/ Ethnicity, Narrative versus Non-Narrative Format by Education, and Narrative versus Non-Narrative Format by Income.

3. Results

Preliminary analysis using *t*-test showed that there were no differences between the two treatment conditions (narrative versus non-narrative) regarding participants' age, gender, race/ethnicity, education, income and marital status (all *ps* > 0.15).

3.1. Main effects of narrative versus non-narrative message format

3.1.1. Knowledge of pandemic influenza—Baseline knowledge about pandemic influenza was not different between the narrative ($M = 6.87$, $SD = 1.57$) and non-narrative ($M = 6.79$, $SD = 1.57$) treatment groups, $t(615) = 0.65$, $p = 0.51$. Analysis of covariance indicated that message format has a small but significant main effect on Knowledge of Pandemic Influenza, $F(1, 559) = 10.12$, $p < 0.01$, $\eta^2 = 0.02$. Individuals who viewed the non-narrative version ($M = 8.33$, $SD = 0.089$) scored higher on knowledge items related to pandemic influenza compared to those who viewed the narrative version ($M = 7.93$, $SD = 0.087$).

3.1.2. Response efficacy—A *t*-test showed that baseline Response Efficacy was not different between the narrative ($M = 5.69$, $SD = 1.09$) and non-narrative ($M = 5.68$, $SD = 1.11$) treatment groups, $t(619) = 0.04$, $p = 0.97$. Analysis of covariance showed that message format has a small but significant main effect on Response Efficacy, $F(1, 566) = 3.82$, $p < 0.05$, $\eta^2 = 0.01$. Participants who viewed the non-narrative version ($M = 6.20$, $SD = 0.058$) rated the recommended responses to pandemic influenza as more effective compared to those who viewed the narrative version ($M = 6.04$, $SD = 0.056$).

3.1.3. Moderated effects of narrative versus non-narrative message format—None of the interaction terms was significant, suggesting that the effects of message format did not vary across socio-demographic population groups. Post-viewing scores (estimated marginal means or means adjusted for baseline scores) of Knowledge of Pandemic Influenza and Response Efficacy were consistently higher in the non-narrative condition compared with the narrative condition across the five socio-demographic groups of age, gender, education, race/ethnicity and income (see Tables 1 & 2 and Figs. 2 & 3).

4. Discussion

This study showed that a non-narrative message format may be more effective than its narrative counterpart to communicate basic prevention information during public health emergencies. Compared with the narrative and/or fictional version, the more didactic and factual format was found to be more effective in changing knowledge and perceived response efficacy related to prevention of pandemic influenza. Moreover, the study showed that effects of message format do not vary across socio-demographic population groups; effects on the two outcome variables (Knowledge of Pandemic Influenza and Response Efficacy) were generally consistently higher in the non-narrative treatment condition compared with the narrative condition.

These findings contradict previous studies that have compared narrative and non-narrative message formats in promoting health out-comes (Murphy et al., 2015; Frank et al., 2015; Moran et al., 2013). They are, however, consistent with a previous public health emergency communication study which concluded that entertainment-education, a widely used narrative format, lacked the capability either to fully educate people about preparedness or prompt them to get ready for an imminent threat (Kruvand and Bryant, 2015). Moreover, our findings do not necessarily conflict with the overall theoretical propositions and rationale for the use of narratives in public health communication. One of the main reasons why a narrative format has been shown to be more effective than a non-narrative format is related to its capacity to reduce resistance to message reception and processing. It has been argued that story features, such as narrative transportation and involvement with characters may help to reduce different forms of resistance to persuasion (Moyer-Guse and Nabi, 2010), and may thus offer narratives a comparative advantage over non-narratives (Murphy et al., 2015). And, as noted above, this has been demonstrated to be helpful for conveying potentially counterattitudinal or contentious health messages such as taking HPV vaccines and screening for cancer (Murphy et al., 2015; Frank et al., 2015; Moran et al., 2013). However, the present study suggests that in dealing with public health emergency situations, using a non-narrative format and providing the required prevention information in a more direct manner might be more useful as there may be less of a need to engage and/or transport audiences in the absence of counterargument.

Similarly, narratives have been shown to be more effective than non-narratives because of their potential to convey health-related messages that are likely to evoke fear in a less direct and less threa-tening manner. As such, using narratives that have the potential to convey health messages in a less threatening manner may be needed in promoting “detection” behaviors such as undergoing cancer screening. However, in promoting “preventive” measures to protect oneself from an immediate threat of pandemic influenza, the more direct format of a message might be more effective. Indeed, the urgent nature of public health emergencies does not afford public health professionals the time to design and employ subtler messaging strategies such as narratives; likewise, the public would not have the time to process and decipher the key messages from the storyline.

4.1. Limitations

Partly because the pre-test scores of both outcome variables were already high (due perhaps to the very basic nature of the knowledge and emergency-response questions we asked), message format manipulation yielded small effects. However, such effects are not unusual in research involving relatively large audiences, and even such small effects have been shown to have meaningful population-level impact (Murphy et al., 2015; Wakefield et al., 2010). Additionally, given our focus on short-term effects of informational interventions during public health emergencies, the posttest was administered immediately after the participants viewed the video clips. This may have contributed to the small effect sizes we found. It might well be the case that some time may have been needed to detect effects from some participants. Also, exemplification theory (Zillmann, 1999) and sleeper effect research (Kumkale and Albarracín, 2004) might expect the narrative information to gain an advantage over time, particularly if it is comparatively vivid or emotionally evocative. In the case of an acute emergency such as emergency communication, however, time might be less of a factor as the situation requires rapid knowledge acquisition and response. That the narrative stimulus was edited out of a fictional video should also be taken into account. Although it has long been argued that fictionality does not matter and both fictional and non-fictional narratives involve basically the same processes of persuasion (Busselle and Bilandzic, 2008; Green and Brock, 2000), Braddock and Dillard's (2016) meta-analysis calls for further studies on the role of fictionality. Also, in fictional narratives, beyond content, stylistic features may need to be taken into account. Last but not least, because knowledge and perceptions related to response efficacy tend to be the primary focus of informational interventions during public health crisis, the outcomes of interest in this study were knowledge and perceived response efficacy. Future studies testing these message formats for public health emergency communication should address the limitations outlined here in general, and should also test the relative effectiveness of these formats on other outcome variables that are more proximal to behavior.

5. Public health implications

In public health communication, a burgeoning body of research suggests that narrative communication results in positive health out-comes. Compared with the more traditional fact-based approach, this messaging strategy has been shown to be useful to communicate counterattitudinal, potentially contentious health issues. While the rationale behind the use of narratives remains theoretically sound and empirically valid, our findings suggest that, in moving forward, it will be more productive for public health researchers and practitioners to step-down from the "narratives bandwagon" and empirically test the relative advantages of this form of communication for the specific health behaviors being promoted. Our findings suggest that during public health emergencies it may not be worth the time, cost, and effort to employ narrative health messages to inform people and encourage the adoption of preventive behaviors.

The sense of urgency characterizing public health emergency requires public health professionals to act abruptly and provide the public with relevant, practical and potentially life-saving information. Likewise, confronted with an imminent threat, the public may not

have the required cognitive resources to decipher messages from subtler messages such as narratives. As such, a more direct and factual messaging strategy may be useful during public health emergencies.

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Narrative Format (Contagion)

Non-narrative Format (Red Cross)

Fig. 1.
Still shots from video clips (USA. 2013).

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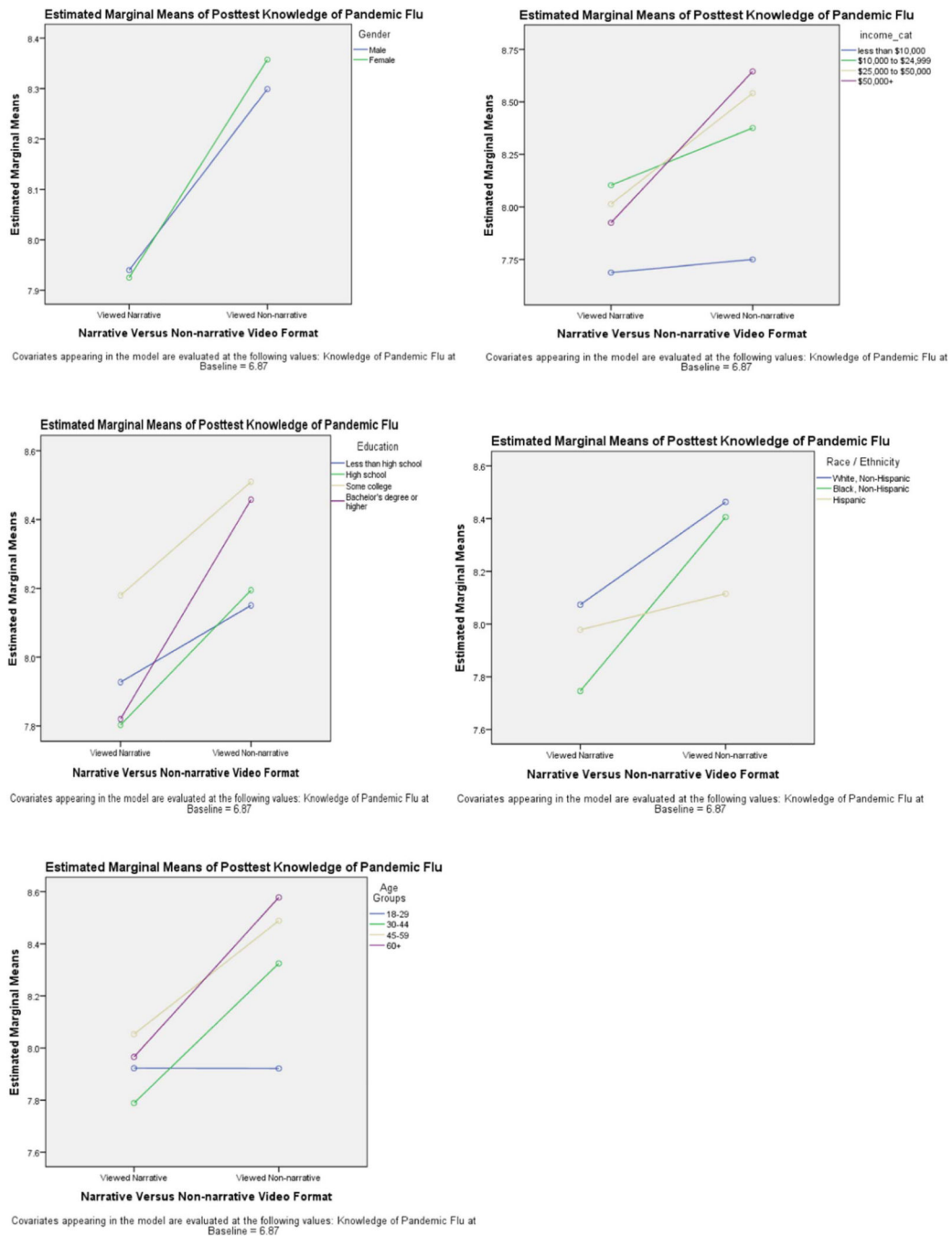


Fig. 2. Plots of marginal means of Knowledge of Pandemic Influenza across age, gender, education, income and racial/ethnic groups (USA, 2013).

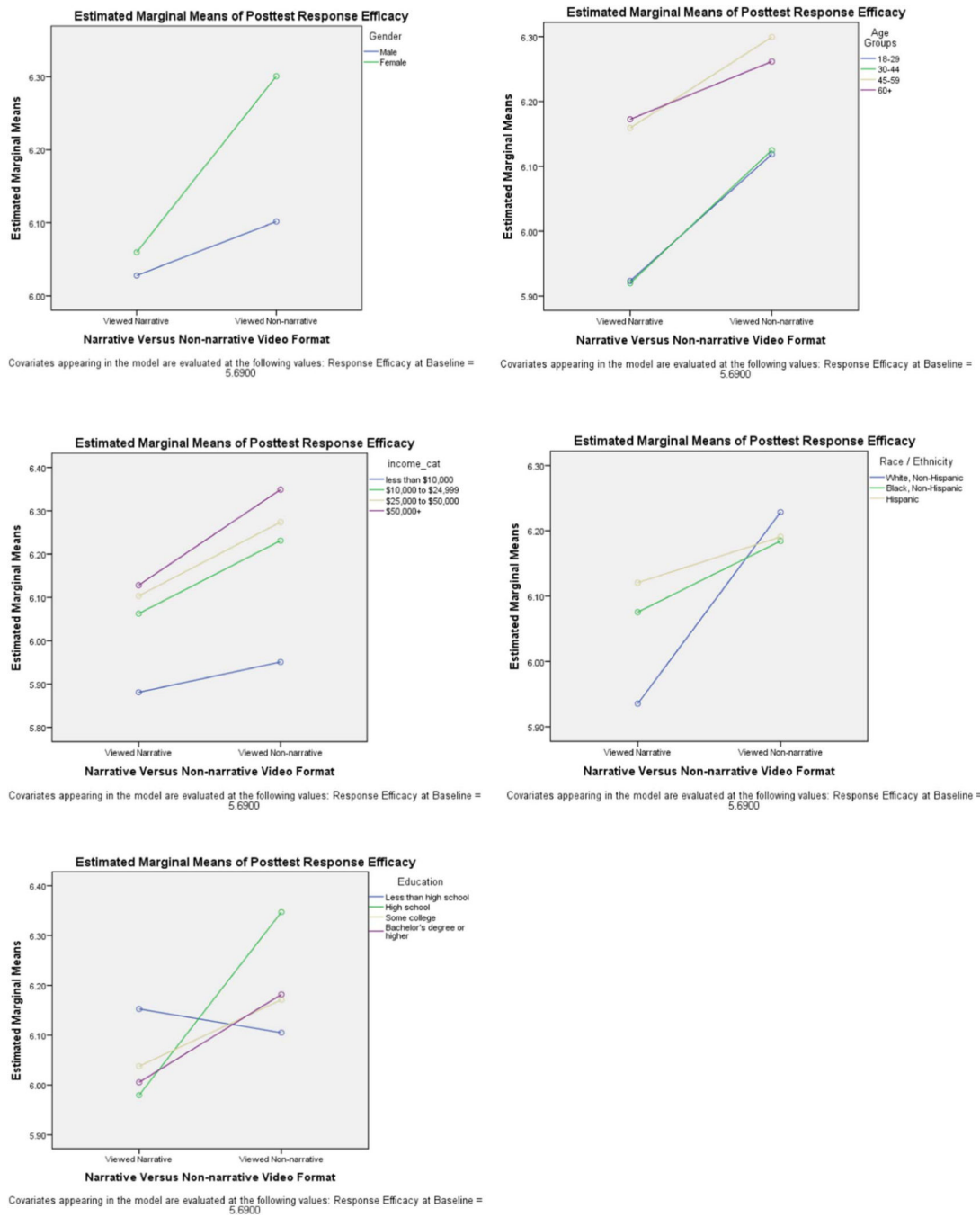


Fig. 3. Plots of marginal means of Perceived Effectiveness of Recommended Responses to Pandemic Influenza across gender, age, education, income, and racial/ethnic groups (USA, 2013).

Table 1

Estimated marginal means and standard errors of Knowledge of Pandemic Influenza in the two treatment conditions (narrative and non-narrative) by socio-demographic factors (USA, 2013).

Socio-demographics		Narrative	Non-narrative
Gender	Male	7.94 (0.12)	8.30 (0.13)
	Female	7.93 (0.12)	8.36 (0.12)
Age	18–29	7.92 (0.18)	7.92 (0.19)
	30–44	7.79 (0.15)	8.33 (0.17)
	45–59	8.05 (0.15)	8.49 (0.15)
	60 +	7.97 (0.18)	8.58 (0.18)
Race/ethnicity	White, non-Hispanic	8.07 (0.15)	8.46 (0.17)
	Black, non-Hispanic	7.75 (0.14)	8.41 (0.15)
	Hispanic	7.98 (0.15)	8.12 (0.14)
Education	Less than high school	7.93 (0.22)	8.15 (0.20)
	High school	7.80 (0.14)	8.20 (0.16)
	Some college	8.18 (0.14)	8.51 (0.15)
	Bachelor's or above	7.82 (0.21)	8.46 (0.19)
Income	Less than \$10,000	7.69 (0.17)	7.75 (0.19)
	\$10,000 to \$24,999	8.10 (0.16)	8.38 (0.15)
	\$25,000 to \$50,000	8.01 (0.16)	8.54 (0.21)
	\$50,000	7.93 (0.16)	8.65 (0.17)

Note: Standard errors are given in parenthesis.

Table 2

Estimated marginal means and standard errors of Response Efficacy in the two treatment conditions (narrative and non-narrative) by socio-demographic factors (USA, 2013).

Socio-demographics		Narrative	Non-narrative
Gender	Male	6.03 (0.08)	6.10 (0.09)
	Female	6.06 (0.08)	6.30 (0.08)
Age	18–29	5.93 (0.11)	6.12 (0.12)
	30–44	5.92 (0.01)	6.13 (0.11)
	45–59	6.16 (0.10)	6.30 (0.10)
	60 +	6.17 (0.11)	6.26 (0.12)
Race/ethnicity	White, non-Hispanic	5.94 (0.10)	6.23 (0.11)
	Black, non-Hispanic	6.08 (0.09)	6.18 (0.09)
	Hispanic	6.12 (0.09)	6.19 (0.09)
Education	Less than high school	6.15 (0.14)	6.11 (0.13)
	High school	5.98 (0.09)	6.35 (0.10)
	Some college	6.04 (0.09)	6.17 (0.10)
	Bachelor's or above	6.01 (0.13)	6.18 (0.13)
Income	Less than \$10,000	5.88 (0.11)	5.95 (0.12)
	\$10,000 to \$24,999	6.06 (0.11)	6.23 (0.10)
	\$25,000 to \$50,000	6.10 (0.13)	6.27 (0.14)
	\$50,000	6.13 (0.10)	6.35 (0.11)

Note: Standard errors are given in parenthesis.