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Effect of Character-Audience Similarity on the Perceived Effectiveness of Anti-Smoking PSAs via Engagement

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Abstract

This study assesses the impact of character-audience similarity, a core aspect of tailored communication, on evaluation of anti-smoking public service announcements (PSAs). Smoker and persuader characters are distinguished to explore their different roles in message effectiveness. Daily adult smokers (n = 1,160) were exposed to four video PSAs randomly selected from a larger pool. Similarity scores were determined from matching in demographic (age, gender, race) and motivational factors (quitting status) between the audience and the PSA's characters. Results show that PSAs featuring distinctive smoker and/or persuader characters yielded significantly higher message engagement and perceived effectiveness (PE) than PSAs without characters. Given the presence of characters, smoker-audience similarity was positively associated with the engagement, which in turn enhanced PE. Persuader-audience similarity failed to predict increases in either engagement or PE.

Keywords

Character-audience similarity; Tailored health communication; Anti-smoking PSA; Exemplification theory; Message engagement; Transportation; Elaboration likelihood model; Perceived effectiveness

Tailoring is an effective health communication strategy for conveying relevant messages to specific target person. By providing information that matches the target audience's needs, tailored health communication is more likely to be consumed and cognitively processed, eventually facilitating desirable behavioral changes when compared to more generalized communication strategies (Kreuter, Bull, Clark, & Oswald, 1999). The current study focuses on a core aspect of tailoring; namely, matching the information to the audience's demographic characteristics in the context of anti-smoking public service announcements (PSAs).

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Character, Similarity and Persuasion

Research has shown that source-receiver similarity facilitates persuasion by increasing positive emotional responses. Possession of similar attitudes and traits (Eagly & Chaiken, 1993) or sharing membership in a group (Wilder, 1990) was found to be positively associated with liking the persuader and endorsing the persuasive message. A meta-analysis of HIV interventions found that demographic and behavioral similarity between the source and recipients resulted in more positive behavioral changes (Durantini, Albarracín, Mitchell, Earl, & Gillette, 2006).

A necessary condition for greater or lesser similarity is the presence of characters in the message. Many - but certainly not all - anti-smoking PSAs have relevant characters. Without a relevant character, character-audience similarity cannot be determined. As such, it is possible that there are qualitative differences between messages with and without characters. Indeed, many researchers in message effects emphasize the role of characters in learning and persuasion. Exemplification theory (Zillmann, 2006) posits that using exemplars, often comprised of the story of relevant characters, induce more attention, comprehension, recall and emotional responses to a message. In smoking-related news articles, exemplification was observed to enhance engagement with the article, which in turn increased intention to quit smoking (Kim, Bigman, Leader, Lerman, & Cappella, 2012). Having identifiable targets in messages produced stronger affective reactions when compared to statistical information about targets in general (Small & Loewenstein, 2005). Therefore, prior to examining the effects of character-audience similarity, it is necessary to first examine the difference characters make for engagement and effectiveness.

Characters are deployed in a variety of forms and roles in health messages. Table 1 lists the various forms and roles observed in anti-smoking PSAs and how they were treated in the present study. First of all, there are smokers, who we might label *exemplars* of the negative consequences of smoking. This may include the deceased as an example of the extreme negative consequences of smoking, or former smokers that discuss benefits of cessation. Messages may feature a separate non-smoker *persuader* who delivers the anti-smoking messages. For anti-smoking PSAs targeting current smokers, it is possible that different characters exert different influence in target audience's message processing. Smoker characters are in the same situation as current smoker audiences. The audiences are in a position to identify with similar smoker characters in an anti-smoking PSA and feel that the message is more relevant to them, all of which may affect persuasion. On the other hand, while similar persuader characters may be liked and trusted more than dissimilar ones, non-smoker persuaders are subject to knowledge bias (Eagly, Wood, & Chaiken, 1978). The fact that they do not have direct experiences in smoking presents a fundamental dissimilarity with current smoker audience, which is potentially crucial considering that the messages are anti-smoking ones. In spite of the potential differences, to our best knowledge, no existing study has attempted to explicitly distinguish the role of different characters regarding which one's similarity matters more to message effectiveness.

Many studies examined the effect of similarity between the audience and persuader characters but otherwise the literature has ignored similarity with other types of characters.

Wang and Arpan (2008) observed that subjects responded more favorably to anti-HIV messages promoting condom use when the spokesperson shown in the picture was from matching ethnic backgrounds. African American subjects who read persuasive messages featuring an African American spokesperson agreed more with the message than those who read messages with White spokesperson; the difference was not significant for White subjects. Incidental similarity, such as shared hometown, birthday or name between the sales person and potential customer has also been shown to positively affect the success rate of sales activity (Jiang, Hoegg, Dahl, & Chattopadhyay, 2010).

Some researchers chose to manipulate the exemplar rather than the persuader to match audience characteristics. In testing a tailored anti-smoking intervention program, Strecher et al. (2008) used different pictures of smokers to manipulate the depth of tailoring. The low-tailoring condition only matched the smoker's gender with the audience, while the high-tailoring condition matched gender, age, and race, in addition to other factors such as stage of change, smoking history, marital status and children in household into the message. After 6 months, those in the high-tailoring condition showed significantly higher cessation rates. Curtis (2010) found that in tailored messages promoting use of nicotine replacement patches, tailoring on psychological ("content variables") and demographic factors ("feature variables") significantly increases persuasive outcomes. Tailoring content variables increased the intention to use the patch. Matching the testifiers' demographic features to that of the audience enhanced message engagement. Another study tested tailored letters including pictures of women discussing their mammogram experience. Creating a match for the target audience on features such as race, age, and past screening experience improved the recipients' information recall and their mammography screening status (Skinner, Strecher, & Hospers, 1994).

Many studies provide supporting evidence that character-audience similarity matters in enhancing persuasion. However, they do not address the question of *which* character should be tailored to match the target audience in a multi-character message. The current study attempts to distinguish the different roles of characters on effectiveness of PSAs and to explore which character matters more in persuading current smokers. Tailoring the characters to match the target audience involves a series of decisions including what aspects and who should be tailored. Since character-audience similarity has already been shown to enhance the persuasive efficacy of messages, understanding how different characters and roles affect this relationship can help optimize tailored message design. To investigate this problem, separate similarity scores were calculated for smoker and persuader characters present in the PSAs, enabling the examination of the potential different persuasive effects of persuader-audience and smoker-audience similarity.

The effectiveness of messages is assessed here using perceived effectiveness (PE) as an indicator. PE has been shown to be associated with actual effectiveness measured by attitude toward and intention to perform the target behaviors in persuasive messages such as voting, fruit and vegetable consumption, and preventing sexually transmitted infections (Dillard, Weber, & Vail, 2007). Consistent to the result of Dillard et al.'s meta-analysis, PE was also shown to affect current smokers' behavioral intentions to quit smoking (Bigsby, Cappella, & Seitz, 2013). Adult smokers evaluated multiple anti-smoking PSAs for PE, and then reported

their intention to quit smoking after watching the PSAs. Individual PE responses were aggregated to create message-level summed totals, establishing the causal order between PE and intention. The message-level PE significantly increased post-exposure intention to quit smoking, providing good evidence that PE is a valid and efficient measure of message persuasiveness unconfounded by the evaluators' own intention to quit or not. We hypothesize a positive association between character-audience similarity and PE.

H1a. Smoker-audience similarity will increase the audiences' PE of anti-smoking PSAs.

H1b. Persuader-audience similarity will increase the audiences' PE of anti-smoking PSAs.

Character-audience similarity and message engagement

Message engagement, or the audience's attention to and involvement with the message, is crucial in persuasion, and can be one of the key mechanisms for a similarity-persuasion linkage. Audiences generally engage with the message when they identify with the characters (Cohen, 2006). Identification is "an imaginative process through which an audience member assumes the identity, goals, and perspective of a character" (Cohen, 2006, p. 184). Actual or perceived similarity between the audience and character is expected to facilitate identification (Slater & Rouner, 2002). These theories of identification are closely linked to social cognitive theory (Bandura, 2009) which emphasizes observational learning through behavioral modeling. Modeling is enhanced when models are similar to the audience (or to those the audience wants to be like). Moyer-Gusé (2008) theorized that "perceived similarity and identification with a vulnerable character will enhance the persuasive effects of entertainment-education content by increasing a viewer's perceived vulnerability" (p.419). Audiences gain motivation and self-efficacy through identification (Slater, 2002), which would increase the likelihood of engaging in the promoted behaviors (De Graaf, Hoeken, Sanders, & Beentjes, 2012).

Narrative persuasion research uses the concept of transportation, "a convergent process, where all mental systems and capacities become focused on events occurring in the narrative" (Green & Brock, 2000, p. 701), to capture the audience's engagement with the message. Engagement with the message is likely to be enhanced by the presence of characters, especially ones that are similar to the audience. Green (2004) found that familiarity with characters who undergo similar experiences as the audience will increase transportation into the narrative. In a study using films related to cervical cancer, Mexican Americans reported significantly stronger transportation, identification and emotion toward narrative featuring Latina characters than European Americans (Murphy, Frank, Chatterjee, & Baezconde-Garbanati, 2013).

Other theories such as the elaboration likelihood model (ELM; Petty & Cacioppo, 1986) also imply that in certain conditions character-audience similarity can facilitate central processing when audiences think the events described in the message are likely to occur to them because they happened to those who are similar to themselves (Briñol & Petty, 2006; Fleming & Petty, 2000). The deliberate nature of central processing, or higher engagement, can in turn enhance persuasion provided that the argument is strong and generates mostly

favorable thoughts. Tailoring may enhance persuasion through this mechanism. Jenson and colleagues found that the effect of tailored messages on promoting mammograms was fully mediated by perceived personal relevance (Jensen, King, Carcioppolo, & Davis, 2012). Moreover, as mentioned earlier, encountering similar characters – especially similar smoker characters – in messages is likely to increase perceived relevance. Therefore, we expect and hypothesize that character-audience similarity will enhance the message's persuasive effect by increasing perceived relevance, which will also increase audiences' engagement with the message.

H2a. Smoker-audience similarity will increase audiences' engagement with anti-smoking PSAs.

H2b. Persuader-audience similarity will increase audiences' engagement with anti-smoking PSAs.

The impact of character-audience similarity both on engagement and PE of messages is examined. While engagement is an important outcome in itself, its potential mediating role in persuasive outcomes is even more important for successful interventions. While many studies have found a positive effect of character-audience similarity on persuasion, results are not always unequivocal, especially regarding similarity on superficial features such as demographics (e.g. Brosius, 1999). Researchers emphasize that perceived similarity would matter for identification, and that the sources of perceived similarity are diverse, including commonalities in demographics, situation and personality traits (Cohen, 2006). The social attraction facilitated by commonalities between persuader and the audience may not exert a direct linear effect on attitude changes (Simons, Berkowitz, & Moyer, 1970). The effect of objective, rather than perceived, similarity may be more subtle and indirect.

Identification and subsequent empathetic connections with the characters allows the audience to embrace the characters' experiences and perspectives with less resistance (Dal Cin, Zanna, & Fong, 2004). Anti-smoking PSAs offer messages that can easily activate the smokers' psychological reactance. In this light, similarity to and identification with characters may work to counteract these resistive tendencies.

Therefore, combining *H1* and *H2*, it is expected that the relationship between character-audience similarity and PE will be mediated by engagement.

H3a. Engagement will mediate the relationship between smoker-audience similarity and PE.

H3b. Engagement will mediate the relationship between persuader-audience similarity and PE.

Method

Subjects

Our study is a secondary analysis of two tobacco control studies conducted in 2009 and 2010.[1] Both studies used a nationally representative sample of current smokers from the *GfK Custom Research* (formerly *Knowledge Networks*) web-based panel. In both studies,

each participant watched and evaluated four anti-smoking PSAs randomly selected from a pool of ads. A total of 1,160 respondents participated in the two studies; due to missing responses for some evaluation questionnaires, 4,588 evaluations were included in the analyses. All respondents were current smokers who reported smoking at least 5 cigarettes a day and more than 100 cigarettes in their lifetime. The mean age was 47.9 years old, *SD* = 11.49, ranging from 18 to 66. 51.1% were female. The majority reported being European American/White (75.4%), and 10.3% as African American/Black, and 14.2% as other, including, but not limited to, Hispanic and Asian. The respondents have been smoking for average 32.26 years, *SD* = 11.98, (range 0 to 59), with average 24.54 cigarettes per day. On average the subjects tried to quit smoking 5.51 times, *SD* = 10.94; mean score for Fagerström Test for Nicotine Dependence was 4.26, *SD* = 2.34 (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Subjects' quitting status was determined in pre-testing on a measure of the stages of change (Prochaska & DiClemente, 1982), where the response options ranged from 0 ("*I have not had thoughts about quitting smoking*") to 10 ("*I am taking action to quit smoking*"), *M* = 5.60, *SD* = 2.86.

PSA Coding

In total, the two studies used 60 and 40 television anti-smoking PSAs respectively. Three independent coders coded the 100 PSAs for the presence of any smoker and persuader characters and their demographics (see Table 1 for different roles of characters). A character in the PSA is defined as a smoker if he or she is shown to be smoking a cigarette, or his or her smoking habits or history is explicitly mentioned. Former smokers were also coded as smoker characters. A persuader is defined as a character who delivers the anti-smoking message in the PSA, which can include the voice-over narration. In 15 PSAs, one character acted as both smoker and persuader, and thus the same demographic information was coded for both smoker and persuader character. Characters who are neither smokers nor persuaders (e.g. tobacco company executives, secondhand smoking victims) were excluded from the coding.

Smoker and persuader characters were identified and coded for their gender (male vs. female), race/ethnicity (White vs. Black vs. other/can't tell), and age (baby/children vs. adolescent/teenager vs. 20-30 year-old young adults vs. 31-45 year-old middle aged adults vs. 46-60 year-old mature adults vs. over 60 year-old seniors vs. can't tell). Quitting status (former smoker vs. trying to quit vs. not trying to quit vs. deceased) was also coded for smoker characters. Since there were many non-smoker persuaders, quitting status were not included in coding for persuader characters. The smokers who explicitly mentioned their intention or effort to quit smoking, or using instruments to help cessation such as nicotine patches, were considered to be trying to quit.

Coders went through five training sessions, test-coding 40 anti-smoking PSAs that were similar but not the same as the ones included in the current study. Disagreements were resolved in face-to-face meetings until all coders achieved reliability (Cohen's κ) of at least .70. Twenty out of 100 PSAs were coded by all three coders, and all κs ranged from .74 to

[1]The two studies were funded by the grants from the National Cancer Institute's Center of Excellence in Cancer Communication (CECCR) located the Annenberg School for Communication, University of Pennsylvania (P20-CA095856).

1.00,[2] well over the minimum for a substantial agreement, κ = .60 (Landis & Koch, 1977). The remaining 80 PSAs were divided among the three to be coded independently.

As mentioned earlier, some PSAs do not feature any distinctive smoker and/or persuader characters; 15 PSAs (769 out of 4,588 responses) have neither distinctive smoker nor persuader characters. In addition to above-mentioned 15, 22 PSAs did not have a distinctive smoker character, and 7 did not have a distinctive persuader character.

Measures

Similarity—Subjects' similarity with the smoker character and the persuader character were calculated as two separate scores using multiple matching criteria: race, gender, age and quitting status (for smokers only). In terms of quitting status, the subjects' responses to stages of change were dichotomized so that responses ranging from 0-5 were coded as "*not trying to quit*" and 6-10 as "*trying to quit*." 576 (49.7%) fell into the "*trying to quit*" category, and 584 (50.3%) were in "*not trying to quit*" category.

Each criterion was given a 1 if the character and subject matched and 0 if they did not. The scores were summed to form the final similarity score. Therefore, zero in the summed similarity score would mean that the character and the audience were completely dissimilar from each other. For example, if John (male, white, 65, trying to quit) watched a PSA that depicted a smoker (male, white, young adult, not trying to quit) he would score 2 on his similarity with the smoker character; if a young black woman then appeared on the screen encouraging John to call a quit line, John would score zero on his similarity with the persuader character. When multiple smokers or persuaders were present, all of them were coded for their demographics and quitting status, and similarity score was calculated if any one of the characters matches with the audience for each criterion. Therefore, if John from above example watched a PSA with two smokers (A: white, female, young adult, not trying to quit; B: black, female, senior, trying to quit), John would score 3 on his similarity with the smoker characters – one for race-matching with A, one for age-matching with B, and one for quitting status-matching with B. If more than one characters match on one criterion with the audience, it was counted only once. For example, if John watched another PSA with two smokers, both white, male, senior, trying to quit, John would still score 4 on his smoker-audience similarity score – one for race-matching, one for age-matching, one fore gender-matching and one for quitting status-matching. In this approach, those who watch PSAs with multiple characters are more likely to have higher character-audience similarity. Therefore, the number of relevant characters was used as control variable in all analyses.

When there are distinct characters, smoker-audience similarity can range from 0 to 4, median = 2, *IQR*: 1-3. Persuader-audience similarity can range from 0 to 3, median = 1, *IQR*: 1-2.

[2]Smoker characters' number, race, gender, and persuader characters' gender and age showed perfect agreement (Cohen's κ = 1.0). Smoker characters' quitting status (κ = .85), age (κ = .79), persuader characters' number (κ = .81) and race (κ = .74) showed some disagreement but in acceptable range. The disagreements were resolved in face-to-face discussion among the coders.

Engagement—Participants' level of engagement with the PSAs was measured with three questions adopted and modified from transportation theory (Green & Brock, 2000). Participants evaluated their experience of watching each PSA on five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*): (a) I could picture myself in the scene of the events shown in the ad; (b) The ad affected me emotionally; and (c) The events in the ad are relevant to my everyday life. The responses all loaded on a single factor (eigenvalue = 1.73), and were averaged to create engagement measure (Cronbach's α = .82; M = 2.73, SD = 1.00).

Perceived Effectiveness—Perceived message effectiveness (PE; Bigsby et al., 2013) was assessed using four items asking the extent to which the participants agree with statements (a) This ad was convincing; and (b) Watching this ad helped me feel confident about how to best deal with smoking. In addition to these two statements, positive and negative thoughts were measured: (c) The ad put thoughts in my mind about quitting smoking; and (d) The ad put thoughts in my mind about continuing to smoke. Unfavorable thoughts (d) was subtracted from favorable thoughts (c). The resulting score was scaled back to the range of 1-5 and was then averaged with the remaining two items (a) and (b) to create the measure of perceived effectiveness (Cronbach's α = .75, M = 2.98, SD = .83).

Control variables—Subjects' demographics and some message features that affect persuasion were used as control variables. Argument strength of the PSAs was rated by a separate sample of smokers. Raters read textual paragraphs representing the core argument of the ads and then answered multiple questions (Zhao, Strasser, Cappella, Lerman, & Fishbein, 2011), including "The statement is a reason for quitting smoking that [(a) is believable, (b) is convincing, (c) helped me feel confident about quitting smoking]". Message sensation value (MSV) and the use of narrative format were assessed by human coders who watched the PSA video clips. MSV was calculated as a sum of several features present in the message (e.g. Visual – presence of animation, special visual effect, slow/fast motion, intense moments, unusual colors; Audio – sound saturation, slow/fast voice; Content – unexpected format, surprising ending, etc.) and counts of visual aspects such as human faces, edits, and cuts (Kang, Cappella, & Fishbein, 2006; Morgan, Palmgreen, Stephenson, Hoyle, & Lorch, 2003). Narrative was defined as a person's story, typically one with a point or moral, and each PSA was coded for the presence or absence of narrative form.

The number of characters in PSAs varies as some have multiple characters and others none. Having multiple characters would increase the possibility that any audience member finds more matches with the characters, and thus those who watched multiple-character PSAs would receive higher similarity scores than those exposed to single-character PSAs. For character-present PSAs that were included in the main analyses, the associations between the number of characters and the similarity score are strong; γ_{smoker} = .55 and $\gamma_{\text{persuader}}$ = .72. To adjust for this problem, the number of relevant characters, ranging from one to four (where four or more characters are present), was included as a control variable in models analyzing character-present PSAs.[3] Since the data were collected in two studies, a dummy variable (Study ID) was also included as control variable in all analyses.

Analysis

Each respondent watched four PSAs. Each PSA was shown to multiple respondents (range: 23 – 75, $M = 46.40$, $SD = 13.65$). The responses were not independent, as each response was doubly-nested within a PSA as well as within a respondent, and therefore cross-classified model was fitted in order to properly analyze the data. Cross-classified models were fitted using multilevel mixed-effects linear regression in STATA 12. Also, joint significance tests (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) were used to assess the existence of any indirect effect of similarity on PE via engagement. One can reject the null hypothesis that the indirect effect of X on Y via M is zero when the effect of X on M and that of M on Y, controlling for X, are statistically significant.

The similarity score was treated as an ordinal variable. The similarity score from those who watched character-present PSAs ranged from zero to either four (smoker-audience similarity) or three (persuader-audience similarity), but there were relatively few cases with the highest scores. Therefore, the two highest scores were grouped together, resulting in four categories for smoker-audience similarity (0, 1, 2, and 3+) and three for persuader-audience similarity (0, 1, and 2+).

Results

To examine the research question on the effect of character presence, differences in engagement and PE scores for PSAs with and without characters were examined. The scores were aggregated for each PSA among the respondents who were exposed to the same PSAs. Table 2 shows that the 15 PSAs without any smoker and/or persuader character were evaluated significantly lower in both engagement ($M = 2.49$, $SD = .25$) and PE ($M = 2.79$, $SD = .19$) than the 85 featuring one or more characters (engagement: $M = 2.78$, $SD = .36$; PE: $M = 3.04$, $SD = .27$; all ps < .01). Similar results were found between no-smoker ($n = 37$) and smoker-present PSAs ($n = 63$), and no-persuader ($n = 22$) and persuader-present PSAs ($n = 78$).[4]

The similarity between audience and characters in PSAs can only be assessed when characters are present. Therefore, the following analyses excluded the 37 no-smoker and 22 no-persuader PSAs for the relevant character-audience similarity. This conceptual decision is consistent with a strong multicollinearity problem that arises if no-character ads were included and treated as if they produced zero similarity. That is, there is a very strong association between number of characters and character-audience similarity in all 100 PSAs, including no-smoker and no-persuader PSAs: $\gamma_{\text{smoker}} = .89$ and $\gamma_{\text{persuader}} = .90$.

The Unconditional cross-classified models, without any predictors or control variables, were fitted to check the intra-class correlations (ICC). For the 63 smoker-present PSAs, 11.7% out of total variance in engagement was explained by PSA-level clustering, and 39.4% by

[3]In spite of the high γ statistics, VIFs for character-audience similarity and number of characters were all lower than 2.5 when only character-present PSAs were used in analyses.

[4]On the other hand, single- and multiple-character PSAs were not significantly different from each other in terms of their evaluation results. In models using character-present PSAs where number of characters was included as key independent variable and character-audience similarity was not included, number of characters failed to yield significant overall effect on engagement and PE, all $\chi^2 < 3.50$ and all ps > .30.

individual-level clustering; 8.4% out of total variance in PE was explained by PSA-level and 48.8% by individual-level clustering. Similarly, among the 78 persuader-present PSAs, 11.4% of variance in engagement was explained by PSA-level clustering and 41.9% by individual-level clustering; 7.6% of variance in PE was explained by PSA-level and 50.4% by individual-level clustering.

Conditional cross-classified models, including smoker- or persuader-audience similarity as well as other control variables were analyzed to test the main hypotheses (see Table 3 for detailed results). Figure 1 shows the effect of smoker- and persuader-audience similarity scores on engagement and PE.

Overall the effect of smoker-audience similarity on message engagement was significant, χ^2 (3) = 7.83, p = .05. The more the audience finds matches with the smoker character present in the PSA, the more one would be engaged with the PSA, resulting in significant difference between zero and 3+ matches. This conditional model explained 45.1% of PSA-level and 90.4% of individual-level variance in engagement. For PE, smoker-audience similarity did not exert significant effect, χ^2 (3) = 4.39, p = .22. Therefore, *H2a* was supported, while *H1a* was not.

On the other hand, persuader-audience similarity given character presence did not show significant effect on engagement or PE, all χ^2s < 3.50, all ps > .20[5]. Therefore, *H1b* and *H2b* were not supported.[6],[7]

Joint significant tests (MacKinnon et al., 2002) were used to test mediation hypotheses *H3a* and *H3b*. Engagement was found to be significantly associated with PE after controlling for relevant character-audience similarity (Bs = .48-.49, SEs = .01, all ps < .001). Since smoker-audience similarity was observed to exert a positive effect on engagement, *H3a* was supported according to the logic of joint significant test. While smoker-audience similarity does not have significant direct effect on PE, it exerts significant indirect effect on PE via engagement. On the other hand, given character presence, persuader-audience similarity did not have significant effect on engagement. Therefore, *H3b* was not supported.

Discussion

The goal of the present study was to test the effect of similarity between the audience and characters on the persuasiveness of anti-smoking PSAs. Specifically, the indirect effect of character-audience similarity on perceived effectiveness of PSAs via engagement was

[5]Some of the persuaders were voice-over only; out of the 78 persuader-present PSAs, 33 PSAs showed only voice-over persuaders. It is possible that voice-over narrations results in weaker identification than fully visible characters. However, when these 33 PSAs were excluded from the analyses, the effects of persuader-audience similarity on engagement and PE still failed to reach significant level, χ^2 < 3.50 and all ps > .10.

[6]Another set of analyses treating similarity as a continuous variable was also conducted. The likelihood-ratio tests suggested no significant differences between models using ordinal or continuous variable (all 7^2s < 3.0, all ps > .20). Consistent results were found: the effect of smoker-audience similarity on engagement is significant (B = .06, SE = .02, p = .01) but not on PE (p > .20). Persuader-audience similarity did not affect either engagement or PE significantly (all ps > .20).

[7]To address the issue of correlation between number of characters and possibility to find a match with characters, ratio-based similarity scores (number of total matches / number of all potential matches) were used as independent variables using PSAs with one, two or three characters. The results are largely consistent, where smoker-audience similarity exerts marginally significant effect on engagement (B = .17, p = .06), but not directly on PE (p > .40), and persuader-audience similarity fails to affect either engagement or PE (all ps > .30).

examined to test one potential mechanism for how similarity might affect persuasiveness. The results indicate that smoker-audience similarity is associated with stronger engagement with the anti-smoking PSAs, which in turn enhances perceived effectiveness. A slightly different pattern was observed for persuader-audience similarity. Persuader-present PSAs received higher evaluation when compared to no-persuader PSAs, but similarity of a given persuader character to the audience did not further affect the dependent variables. The significant positive effect of smoker-audience similarity does suggest that dissimilarity between character and audience can undermine persuasion. When smoker-audience similarity score is zero, i.e. the dissimilarity between them is at its maximal point, the engagement is significantly lower than when the similarity score is the highest (3+ matches).

The results obtained are not from tests of one or two PSAs but rather a set of 100. Although no-character PSAs were excluded from the main analyses due to multicollinearity between similarity and number of characters, there were still more than 60 different anti-smoking PSAs that feature smoker and/or persuader characters. Although some studies have shown that demographic similarity can enhance the efficacy of anti-smoking messages, those studies often selected one specific message that possesses strong content and format features, or a message that is designed to work well with demographic similarity. So while research shows the effect is present with carefully selected messages, it is not clear that the similarity effect is robust outside of individual messages chosen to be effective at the outset of large scale interventions.

Single message experiments remain a valid and efficient way to show effects, but our use of multiple messages does introduce a number of methodological advantages. The study discussed here can be considered as a series of more than 60 mini-experiments, each with its own message. The demographics of characters shown in the PSAs varied across the messages, so that matching and mismatching occurred randomly across subjects. The results from our study extend the external validity of the similarity – outcome relationship to a wide variety of anti-smoking PSAs, none specifically chosen to maximize persuasiveness or engagement. O'Keefe (2015) has noted the importance of multiple-message design from the perspective of replication. Replication is crucial in building evidence-based guidelines for message designs. O'Keefe argued that multiple-message designs can be a more efficient option as "replications can be built into primary research designs" (p. 107). The current study suggests that the effect of smoker-audience similarity on engagement survived the multiple replications built into the overall design.

The PSAs used in this study cover significantly greater variation in anti-smoking messages. There are 10 different themes, including smokers' negative health and life consequences, secondhand smoking, strategy of quitting, and tobacco industry manipulation. Argument strength ranged from 2.36 to 4.14 out of five ($M = 3.36$, $SD = .38$). In single-stimulus studies, if racial matching is employed in a brochure, one picture from each racial group is likely to be selected. That picture could be confounded with other factors such as attractiveness, facial expressions, type of clothing worn, cues to age, and a host of other features, potentially resulting in case-category confounding (Jackson, 1992). All these may interact with the effect of character-audience similarity. By assessing the effects of matching

across a larger sample of messages covering various domains, the current study should also greatly reduce the concern for case-category confounding and extend the external validity.

Also, evidence is robust because it used PSAs produced for actual broadcast, rather than messages fabricated only for research purposes. At first blush, this might be seen as a limitation. Unlike other tailoring efficacy studies, this study did not manipulate character features to match or not match the audiences', and therefore the variables included in the analysis were limited to those clearly observable. Moreover, some of the variables necessitated fairly rough categorization. For example, coders could not define the quitting status of PSA characters very finely, so the audiences' readiness to quit, originally measured using 11-point scale (Prochaska & DiClemente, 1982), had to be dichotomized (trying to quit vs. not trying to quit) to determine if they match on that criterion or not. This resulted in losing some information measured at the individual level. Nevertheless, the merit of the current study lies in its ecological validity preserved by using real-world messages. Moreover, by naturally varying the argument strength of PSAs, this study enhances our understanding of the effect of character-audience similarity over and above the argument strength, a known predictor of ad effectiveness.

Two other design features should be mentioned. There are no measures of perceived similarity and no hints in the survey that the study is about similarity in any way. The findings are due to whatever natural variation in demographic similarity there is across exposures. Second, the design is a true experiment in the sense that each person receives four PSAs randomly selected from the larger samples of 60 PSAs in Study 1 and 40 in Study 2. The degree of similarity is randomly assigned at each exposure.

Theoretical implications

Presence of characters and character-audience similarity—44 of 100 PSAs were missing one or both of the characters. 37 had no smoker and 22 had no persuader character; 15 of them had neither smoker nor persuader character. The elevated scores for engagement and PE when PSAs have characters offer strong testimony to their value in message design at least in the case of anti-smoking PSAs. Effective anti-smoking PSAs are likely to profit from employing distinctive characters so that the audiences can identify with them and engage with the message.

Their lower engagement and PE scores are directly explained by the importance of characters to the narrative characteristic of some PSAs. The presence of narrative format in PSAs is strongly linked to the presence of characters ($\gamma_{\text{smoker}} = .93$, $\gamma_{\text{persuader}} = 1.00$). Narrative form was present in 29 out of the 100 PSAs. All 15 PSAs without smokers or persuaders, and 22 of the PSAs without persuader characters, were non-narrative; 36 out of 37 no-smoker PSAs were non-narrative. By definition, narrative format inherently requires the presence of relevant characters. Some of these no-smoker or no-persuader PSAs did feature some other human characters, but they were not relevant to the narrative format. As the close association suggests, part of the effect of character presence may have been driven by the presence of narratives, which has been shown to facilitate persuasion in anti-smoking PSAs (Durkin, Biener, & Wakefield, 2009) as well as in this study (see Table 3). However, when the 71 narrative-absent PSAs were examined separately, character presence still had

noticeable effect on both outcome variables (all *p*s < .10). This suggests that presence of character can in itself enhance message effectiveness without the presence of narrative.

In addition to the presence of characters, the number of characters may also have affected message evaluation. As mentioned earlier, the more characters present in a PSA, the more likely that an audience finds a match with the character; the data indeed support the expectation. While this may suggest the potential benefit for "rainbow" ads where multiple characters represent diverse subgroups, the current study found that presenting single or multiple characters did not yield significant difference on PSA evaluations (see Endnote 4).

Most tailoring studies focus on the direct comparison between tailored and generic messages rather than the mechanism for such effects. Although our study is not a classic tailoring study, its findings are relevant nonetheless to causal mechanism in tailoring, or at least one venue of tailoring – matching between characters and target audience – via message engagement.

Identification with narrative characters (e.g. "*I felt concerned for the people in the story*") was not directly measured in the present study, but similarity is often regarded as one of the precursors for identification with characters (Murphy et al., 2013; Slater & Rouner, 2002). When the characters present in the PSA share demographic features with the audience, it is expected that the audiences can identify more easily with the characters, and eventually accept the story conveyed by the characters. The significant indirect effect of smoker-audience similarity on PE, mediated by engagement, supports this explanation. Briñol and Petty explains how message tailoring, including manipulation of character-audience similarity, may affect persuasion via increase in audiences' engagement with the message (Briñol & Petty, 2006). This concurs with the finding of indirect effects in our results.

Currently, there are mixed results on the effect of similarity in existing literature. Although tailoring in general has been shown to exert positive effects on persuasion (Noar, Benac, & Harris, 2007), some studies found that targeting based on the audiences' demographics is not effective (e.g. Brosius, 1999). The results from the current study, where similarity did not directly affect perceived effectiveness among Smoker- or Persuader-present PSAs, seem consistent with these null findings. However, the indirect effect observed in our study suggests that smoker-audience similarity does enhance the audiences' engagement, which would in turn facilitate persuasion. In another study using messages promoting the use of nicotine patches to help smoking cessation, demographic similarity was observed to enhanced message engagement, but not the behavioral intention (Curtis, 2010). Message engagement in turn was associated with intentions to use the patch. This is on the same line with our findings. This indirect effect is also consistent with McGuire's steps of persuasion model (1989) where exposure and attention to the message are necessary conditions for acceptance and behavior change. Future research should investigate the role of engagement, identification, and/or other relevant constructs as mediators when testing the effect of tailoring strategies.

The role of different characters in anti-smoking PSAs—The unique contribution of this study is that it has distinguished smoker- and persuader-audience similarity, where

slightly different patterns were indeed observed. Smoker-audience similarity exerts an indirect positive effect on PE via engagement, on top of the effect of its presence. On the other hand, while the presence and absence of persuaders yields significant difference in message evaluation, given character presence, matching the persuader character to the audience does not further enhance engagement or PE (see Figure 1). This suggests that smoker characters should be deemed more important than persuader characters in tailoring or targeting of anti-smoking messages.

When current smokers are exposed to anti-smoking messages, the elaboration likelihood will be at least moderately high due to the topic's relevance. Current smokers may identify with the smoker characters, and engage more with the message when they see smokers similar to themselves perceiving the message to be highly relevant to them. On the other hand, the presence of persuader-audience similarity should enhance liking (and credibility), which might in turn lead to greater acceptance of the message. However, the ELM would suggest that this heuristic cue works only when elaboration likelihood is fairly low – which is not the case in the present study.

Implications on PSA design—Having distinctive smoker and persuader characters in anti-smoking PSAs is an important first step to enhance audiences' engagement with and acceptance of the ad. In addition, smoker-audience similarity is more important than the persuader-audience similarity in its effects. Those who design anti-smoking PSAs for current smokers should expect dividends with the inclusion of characters and any smoker character similar to the target audience.

Limitations and future research

The current study lacks some measurements that potentially can be useful in understanding the observed similarity effects. First, there are no measurements of cognitive processing such as thought listing and processing time, to directly compare situations where elaboration likelihood is high vs. low. As a result, we can only speculate about elaborative processing. Second, the current study determined similarity by comparing their objective matching on demographic variables and quitting status. No measure of perceived similarity (e.g. [The character is] *"like me," "like my friends"*; Andsager, Bemker, Choi, & Torwel, 2006) was available. Also, the audiences' self-identification with race, gender, and age was not measured. Even when many features are matched, it is possible that those may not influence the persuasion if perceived as irrelevant or not salient to the audiences. If relevant features are unmatched, they may draw all the attention and increase the perceived *dis*similarity in spite of other similarities. Fleming and Petty (2000) observed a positive effect of gender matching on persuasion, but only among those who identify with their own gender. Addressing the above-mentioned factors will provide further insights into the cognitive mechanism entailed in the effect of character-audience similarity on persuasion.

Also, this study did not measure involvement with characters. Moyer-Gusé (2008) makes a conceptual distinction between involvement with story and involvement with characters; strictly speaking, engagement measured in this study is closer to involvement with the story. It is plausible that character-audience similarity will be more closely related to involvement

with character than with story. As such, the similarity effect may emerge as a stronger predictor of message persuasiveness if involvement with characters is measured and taken into account.

More complex analyses of smoker and persuader characteristics and their potential interactions must await more tightly controlled experiments where these factors can be manipulated orthogonally to reduce the impact of collinearity on inferences.

It would be naïve to expect similarity to trump all other predictors. Certain themes in anti-smoking PSAs, for example secondhand smoking, may interact in a negative way with smoker-audience similarity. When smokers are depicted as doing harm to others, similarity and subsequent identification with the smoker character may backfire and result in psychological reactance against the message. Future study is called for to test this potential interaction effect.

The current study measured only PE and engagement with PSAs, without measuring actual behavioral change. PE is obviously not equivalent to a measure of intention to behave or of behavior itself. In that sense, PE can only be considered as an indicator of researchers' real interests which must be closer to behavior. Nevertheless, PE has previously been observed to be significantly associated with intention to quit smoking (Bigsby et al., 2013). Smoking is an addictive behavior, which can render intention harder to translate to actual behavior change (Webb & Sheeran, 2006). Yet intention was still able to correctly predict adult smokers' smoking behavior in a 1-year follow-up survey (Fishbein & Cappella, 2006). Therefore, while PE is only a proxy for the actual behavior change which is the ultimate goal for persuasion, its efficiency and theoretical and predictive validity allow the testing of hypotheses within anti-smoking topic across a much wider range of stimuli than would otherwise be possible.

The effect observed here is quite small in its size and only indirect on PE. However, it should also be noted that the observed effect is estimated for exposure to one PSA. Federal and state expenditure in tobacco control continues (U.S. Department of Health and Human Services, 2010), running anti-smoking campaigns with sizable exposure (e.g. McAfee, Davis, Alexander Jr, Pechacek, & Bunnell, 2013). A single exposure may only yield small effect but the effect will be substantial when accumulated over multiple exposures during a prolonged period of time (see Abelson, 1985 for an analogy using baseball players).

Despite these limitations, this study contributes to increasing our understanding on the role of different characters' similarity to audience members and the associated effectiveness of the message. Future research should continue to examine the mediating role of engagement on message persuasiveness. Health messages, or any persuasive messages, should be more effective when designed with the audiences' message engagement in mind, facilitated by appropriately addressing their demographics and other characteristics within the message.

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Reference

Abelson RP. A variance explanation paradox: When a little is a lot. Psychological Bulletin. 1985; 97:129–133. doi: 10.1037/0033-2909.97.1.129.

Andsager JL, Bemker V, Choi H-L, Torwel V. Perceived similarity of exemplar traits and behavior. Communication Research. 2006; 33:3–18. doi: 10.1177/0093650205283099.

Bandura, A. Social cognitive theory of mass communication. In: Bryant, J.; Oliver, MB., editors. Media effects: Advances in theory and research. 3rd. Routledge; New York, NY: 2009. p. 94-124.

Bigsby E, Cappella JN, Seitz HH. Efficiently and effectively evaluating public service announcements: Additional evidence for the utility of perceived effectiveness. Communication Monographs. 2013; 80:1–23. doi: 10.1080/03637751.2012.739706. [PubMed: 25568588]

Briñol P, Petty RE. Fundamental processes leading to attitude change: Implications for cancer prevention communications. Journal of Communication. 2006; 56:S81–S104. doi: 10.1111/j.1460-2466.2006.00284.x.

Brosius H-B. Research note: The influence of exemplars on recipients' judgements. European Journal of Communication. 1999; 14:213–224. doi: 10.1177/0267323199014002004.

Cohen, J. Audience identification with media characters. In: Bryant, J.; Vorderer, P., editors. Psychology of entertainment. Lawrence Erlbaum Associates Publishers; Mahwah, NJ: 2006. p. 183-197.

Curtis, B. Examining the mechanisms of tailoring: Extending the integrative model of behavioral prediction. University of Pennsylvania; 2010. (Doctoral dissertation)

Dal Cin, S.; Zanna, MP.; Fong, GT. Narrative persuasion and overcoming resistance. In: Knowles, ES.; Linn, JA., editors. Resistance and persuasion. Lawrence Erlbaum Associates; Mahwah, New Jersey: 2004. p. 175

De Graaf A, Hoeken H, Sanders J, Beentjes JWJ. Identification as a mechanism of narrative persuasion. Communication Research. 2012; 39:802–823. doi: 10.1177/0093650211408594.

Dillard JP, Weber KM, Vail RG. The relationship between the perceived and actual effectiveness of persuasive messages: A meta-analysis with implications for formative campaign research. Journal of Communication. 2007; 57:613–631. doi: 10.1111/j.1460-2466.2007.00360.x.

Durantini MR, Albarracín D, Mitchell AL, Earl AN, Gillette JC. Conceptualizing the influence of social agents of behavior change: A meta-analysis of the effectiveness of HIV-prevention interventionists for different groups. Psychological Bulletin. 2006; 132:212–248. doi: 10.1037/0033-2909.132.2.212. [PubMed: 16536642]

Durkin SJ, Biener L, Wakefield MA. Effects of different types of antismoking ads on reducing disparities in smoking cessation among socioeconomic subgroups. American Journal of Public Health. 2009; 99:2217–2223. doi: 10.2105/ajph.2009.161638. [PubMed: 19833980]

Eagly, AH.; Chaiken, S. The psychology of attitudes. Harcourt Brace Jovanovich College Publishers; Orlando, FL: 1993.

Eagly AH, Wood W, Chaiken S. Causal inferences about communicators and their effect on opinion change. Journal of Personality and Social Psychology. 1978; 36:424–435. doi: 10.1037/0022-3514.36.4.424.

Fishbein M, Cappella JN. The role of theory in developing effective health communications. Journal of Communication. 2006; 56:S1–S17. doi: 10.1111/j.1460-2466.2006.00280.x.

Fleming, MA.; Petty, RE. Identity and persuasion: An elaboration likelihood approach. In: Terry, DJ.; Hogg, MA., editors. Attitudes, behavior, and social context: The role of norms and group membership. Lawrence Erlbaum Associates Publishers; Mahwah, NJ: 2000. p. 171-199.

Green MC, Brock TC. The role of transportation in the persuasiveness of public narratives. Journal of Personality and Social Psychology. 2000; 79:701–721. doi: 10.1037/0022-3514.79.5.701. [PubMed: 11079236]

Heatherton TF, Kozlowski LT, Frecker RC, Fagerström K-O. The fagerström test for nicotine dependence: A revision of the fagerstrom tolerance questionnaire. British Journal of Addiction. 1991; 86:1119–1127. doi: 10.1111/j.1360-0443.1991.tb01879.x. [PubMed: 1932883]

Jackson, S. Message effects research: Principles of design and analysis. The Guilford Press; New York, NY: 1992.

Jensen JD, King AJ, Carcioppolo N, Davis L. Why are tailored messages more effective? A multiple mediation analysis of a breast cancer screening intervention. Journal of Communication. 2012; 62:851–868. doi: 10.1111/j.1460-2466.2012.01668.x. [PubMed: 26405350]

Jiang L, Hoegg J, Dahl Darren W. Chattopadhyay A. The persuasive role of incidental similarity on attitudes and purchase intentions in a sales context. Journal of Consumer Research. 2010; 36:778–791. doi: 10.1086/605364.

Kang Y, Cappella JN, Fishbein M. The attentional mechanism of message sensation value: Interaction between message sensation value and argument quality on message effectiveness. Communication Monographs. 2006; 73:351–378. doi: 10.1080/03637750601024164.

Kim HS, Bigman CA, Leader AE, Lerman C, Cappella JN. Narrative health communication and behavior change: The influence of exemplars in the news on intention to quit smoking. Journal of Communication. 2012; 62:473–492. doi: 10.1111/j.1460-2466.2012.01644.x. [PubMed: 22736808]

Kreuter MW, Bull FC, Clark EM, Oswald DL. Understanding how people process health information: A comparison of tailored and nontailored weight-loss materials. Health Psychology. 1999; 18:487–494. doi: 10.1037/0278-6133.18.5.487. [PubMed: 10519465]

Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977; 33:159–174. doi: 10.2307/2529310. [PubMed: 843571]

MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. Psychological Methods. 2002; 7:83–104. doi: 10.1037/1082-989x.7.1.83. [PubMed: 11928892]

McAfee T, Davis KC, Alexander RL Jr, Pechacek TF, Bunnell R. Effect of the first federally funded us antismoking national media campaign. The Lancet. 2013; 382:2003–2011. doi: 10.1016/S0140-6736(13)61686-4.

McGuire, WJ. Theoretical foundations of campaigns. In: Rice, R.; Atkin, CK., editors. Public communication campaigns. 2nd. Sage Publications; Thousand Oaks, CA: 1989. p. 43-65.

Morgan SE, Palmgreen P, Stephenson MT, Hoyle RH, Lorch EP. Associations between message features and subjective evaluations of the sensation value of antidrug public service announcements. Journal of Communication. 2003; 53:512–526. doi: 10.1111/j.1460-2466.2003.tb02605.x.

Moyer-Gusé E. Toward a theory of entertainment persuasion: Explaining the persuasive effects of entertainment-education messages. Communication Theory. 2008; 18:407–425. doi: 10.1111/j.1468-2885.2008.00328.x.

Murphy ST, Frank LB, Chatterjee JS, Baezconde-Garbanati L. Narrative versus nonnarrative: The role of identification, transportation, and emotion in reducing health disparities. Journal of Communication. 2013; 63:116–137. doi: 10.1111/jcom.12007.

Noar SM, Benac CN, Harris MS. Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions. Psychological Bulletin. 2007; 133:673. doi: 10.1037/0033-2909.133.4.673. [PubMed: 17592961]

O'Keefe DJ. Message generalizations that support evidence-based persuasive message design: Specifying the evidentiary requirements. Health Communication. 2015; 30:106–113. doi: 10.1080/10410236.2014.974123. [PubMed: 25470435]

Petty, RE.; Cacioppo, JT. The elaboration likelihood model of persuasion. In: Leonard, B., editor. Advances in experimental social psychology. Vol. 19. Academic Press; 1986. p. 123-205.doi: 10.1016/S0065-2601(08)60214-2

Prochaska JO, DiClemente CC. Transtheoretical therapy: Toward a more integrative model of change. Psychotherapy: Theory, Research & Practice. 1982; 19:276. doi: 10.1037/h0088437.

Simons HW, Berkowitz NN, Moyer RJ. Similarity, credibility, and attitude change: A review and a theory. Psychological Bulletin. 1970; 73:1–16. doi: 10.1037/h0028429.

Skinner CS, Strecher VJ, Hospers H. Physicians recommendations for mammography: Do tailored messages make a difference? American Journal of Public Health. 1994; 84:43–49. doi: 10.2105/ajph.84.1.43. [PubMed: 8279610]

Slater MD, Rouner D. Entertainment-education and elaboration likelihood: Understanding the processing of narrative persuasion. Communication Theory. 2002; 12:173–191. doi: 10.1111/j.1468-2885.2002.tb00265.x.

Small DA, Loewenstein G. The devil you know: The effects of identifiability on punishment. Journal of Behavioral Decision Making. 2005; 18:311–318. doi: 10.1002/bdm.507.

Strecher VJ, McClure JB, Alexander GL, Chakraborty B, Nair VN, Konkel JM, Pomerleau OF. Web-based smoking-cessation programs: Results of a randomized trial. American Journal of Preventive Medicine. 2008; 34:373–381. doi: 10.1016/j.amepre.2007.12.024. [PubMed: 18407003]

U.S. Department of Health and Human Services. Ending the tobacco epidemic: A tobaco control strategic action plan for the U.S. Department of health and human services. Office of the Assistant Secretary for Health; Washington, DC: 2010.

Wang X, Arpan LM. Effects of race and ethnic identity on audience evaluation of HIV public service announcements. Howard Journal of Communications. 2008; 19:44–63. doi: 10.1080/10646170701802019.

Webb TL, Sheeran P. Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. Psychological Bulletin. 2006; 132:249–268. doi: 10.1037/0033-2909.132.2.249. [PubMed: 16536643]

Wilder DA. Some determinants of the persuasive power of in-groups and out-groups: Organization of information and attribution of independence. Journal of Personality and Social Psychology. 1990; 59:1202–1213. doi: 10.1037/0022-3514.59.6.1202.

Zhao X, Strasser A, Cappella JN, Lerman C, Fishbein M. A measure of perceived argument strength: Reliability and validity. Communication Methods & Measures. 2011; 5:48–75. doi: 10.1080/19312458.2010.547822. [PubMed: 25568663]

Zillmann D. Exemplification effects in the promotion of safety and health. Journal of Communication. 2006; 56:S221–S237. doi: 10.1111/j.1460-2466.2006.00291.x.

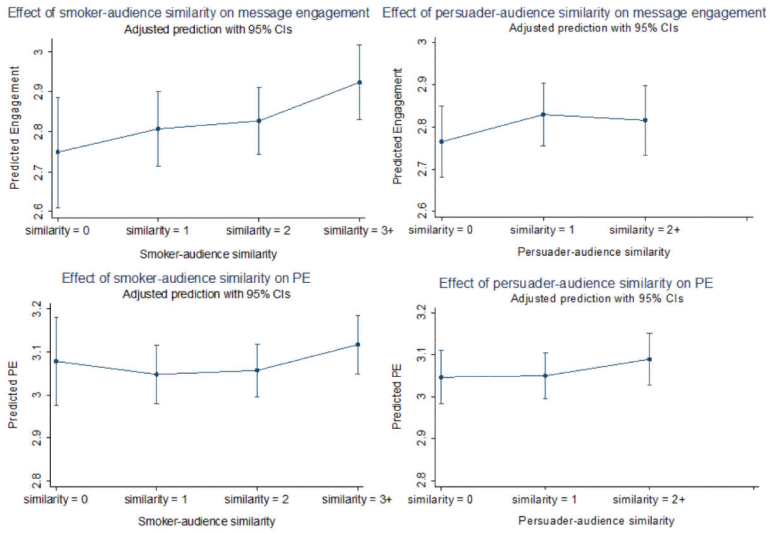

Figure 1.

Predicted engagement and perceived effectiveness (PE) at different points of character-audience similarity. Error bars represent 95% confidence intervals. Predicted values are adjusted with all control variables held at their mean score. Control variables include age, race, gender, quitting status, argument strength, presence of narrative, message sensation value (MSV), number of relevant characters and study ID (see Table 3 for further information on the statistical models).

Table 1

Types of characters and coded information

	Examples	Included in coding
Form of characters		
Human		
Visually shown	Human shown in still or moving images	Yes *
Not shown (1): People referenced by others	"Do you know anybody who's been affected by tobacco-related illnesses?" "Yeah, my uncle and my godmother. They smoked a lot."	Yes * (age, gender and race coded whenever available)
Not shown (2): Voiceover	Narration such as "Quit now for your family. Call 1-800-quit-now."	Yes * (only gender was coded)
Non-human		
With human voice	Animated figure with human voice	Yes * (only gender was coded)
Without human voice	Text on screen	No
Role of characters		
Smokers		
Current smokers	Characters shown as smoking cigarettes; Characters talking about their smoking habits	Yes
Former smokers	Characters talking about their quitting experience	Yes
Deceased smokers	Characters revealed to have died from smoking	Yes
Persuaders	Characters explaining harms of smoking; Characters explaining benefits of quitting; Characters recommending calling quit lines;	Yes
Others	Victim of secondhand smoking, without direct mention of their views on smoking; Tobacco company executives discussing their marketing tactics	No

Note.

* Coded only when their roles are smokers and/or persuaders

Table 2

Mean engagement and perceived effectiveness (PE) of PSAs categorized by presence/absence of characters

	# of PSAs	# of Responses	Engagement			PE		
			M	*SD*	95% *CI*	*M*	*SD*	95% *CI*
All PSAs	100	4,588	2.74	0.36	2.67 ~ 2.81	3.00	0.27	2.95 ~ 3.05
Either-character PSAs	85	3,819	2.78	0.36	2.70 ~ 2.86	3.04	0.27	2.98 ~ 3.09
No-character PSAs	15	769	2.49	0.25	2.35 ~ 2.63	2.79	0.19	2.69 ~ 2.89
			$t = 2.96$, $p = .004$			$t = 3.38$, $p = .001$		
Smoker-present PSAs	63	2,872	2.85	0.37	2.76 ~ 2.94	3.09	0.27	3.02 ~ 3.15
No-smoker PSAs	37	1,716	2.54	0.27	2.45 ~ 2.63	2.85	0.22	2.78 ~ 2.92
			$t = 4.50$, $p < .001$			$t = 4.57$, $p < .001$		
Persuader-present PSAs	78	3,443	2.81	0.36	2.72 ~ 2.89	3.06	0.27	3.00 ~ 3.12
No-persuader PSAs	22	1,145	2.49	0.23	2.39 ~ 2.60	2.78	0.17	2.71 ~ 2.86
			$t = 3.83$, $p < .001$			$t = 4.64$, $p < .001$		

Note. Number of responses refers to the number of responses without missing data on perceived effectiveness.

More responses were missing for engagement, resulting in smaller sample size for models with engagement as a dependent variable (see Table 3).

Table 3

Effect of character-audience similarity on engagement and perceived effectiveness (PE) for character-present PSAs

	Smoker-audience similarity				Persuader-audience similarity			
	on Engagement		on PE		on Engagement		on PE	
Variable	***B***	***SE***	***B***	***SE***	***B***	***SE***	***B***	***SE***
Character-audience similarity								
Similarity = 1	**.06**	**.07**	**−.03**	**.05**	**.06** $^{+}$	**.04**	**.00**	**.03**
Similarity = 2 / 2^{+}	**.08**	**.07**	**−.02**	**.05**	**.05**	**.05**	**.04**	**.04**
Similarity = 3^{+}	**.18** *	**.08**	**.04**	**.06**				
Age	.00	.00	.00	.00	.00 $^{+}$	.00	.00	.00
Race: black	.26 **	.08	.36 ***	.07	.26 **	.07	.35 ***	.06
Race: other	.00	.07	−.08	.06	−.03	.06	−.10 $^{+}$	.05
Gender: female	.19 ***	.05	.13 **	.04	.19 ***	.04	.15 ***	.04
Quitting status	−.33 ***	.05	−.29 ***	.04	−.33 ***	.04	−.29 ***	.04
Argument strength	.14 ***	.03	.08 ***	.02	.16 ***	.03	.10 ***	.02
Narrative	.27 ***	.08	.23 ***	.05	.26 ***	.07	.19 ***	.04
MSV	.00	.01	.00	.00	.00	.00	.00	.00
Number of characters								
2	−.07	.12	−.06	.08	.08	.10	−.02	.07
3	.07	.20	.10	.13	−.23	.18	−.24 $^{+}$	.12
4^{+}	−.02	.10	.03	.06	−.01	.10	−.01	.07
Study ID	−.13 $^{+}$	.08	−.11 *	.06	−.09	.07	−.10 $^{+}$	.05
Constant	3.11 ***	.22	3.50 ***	.16	2.96 ***	.19	3.41 ***	.15
Omnibus test for similarity	$\chi^2(3) = 7.83$ *		$\chi^2(3) = 4.39$		$\chi^2(2) = 3.05$		$\chi^2(2) = 2.04$	
N. of total observations	2,843		2,872		3,406		3,443	
N. of groups - PSA	63		63		78		78	
N. of groups - individual	1,140		1,144		1,150		1,153	
Random effect: variance (*SE*)								
PSA level	.05 (.01)		.02 (.01)		.05 (.01)		.02 (.00)	
Individual level	.36 (.03)		.29 (.02)		.38 (.02)		.30 (.02)	
Residual	.50 (.02)		.28 (.01)		.48 (.01)		.28 (.01)	

Note. All coefficients are unstandardized. For character-audience similarity, reference category (omitted) is similarity = 0. Character-audience similarity scores ranges from 0 to 3+ for smoker-audience similarity, and from 0 to 2+ for persuader-audiences similarity; Age: raw age response; Race: White is reference category; Gender: Male is reference category; Quitting status: 1 = trying to quit, 2 = not trying to quit; Argument strength: normalized argument strength score; Narrative: 0 = narrative absent, 1 = narrative present; MSV = Message Sensation Value; Study ID: 1 = Study 1, 2 = Study 2.

$^{+}p < .10$,

$^{*}p < .05$,

** $p < .01$,

*** $p < .001$.