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Feeling Inspired and Nostalgic: Associations between Media Context-Induced Positive Emotions and Behavioral Change among Vaccine-hesitant Individuals in the Late Stages of the COVID-19 Pandemic

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Abstract

Purpose – Campaigns to promote the COVID-19 vaccination messages to vaccine-hesitant consumers in the late stages of the pandemic are often met with resistance. This study explores a way to leverage positive emotions induced from entertainment media consumption to promote vaccination messages to this audience group.

Design/methodology/approach – An online experiment was conducted with vaccine-hesitant consumers ($N = 409$). Participants viewed personally relevant entertainment music videos or mundane videos and vaccinated messages embedded in user-generated comments.

Findings – Data revealed that feelings of inspiration and nostalgia induced from entertainment media consumption increased vaccination intentions via increased risk perceptions and reduced anti-vaccination attitudes.

Practical implications – Social marketers should consider leveraging the combined effect of entertainment media-induced positive emotions and user-generated comments to motivate behavioral change among vaccine-hesitant individuals in the late stages of the COVID-19 pandemic.

Originality/value – The present study adds to social marketing literature by showing mechanisms that positive emotions induced from entertainment social media consumption might lead to health behavioral change.

Keywords: Vaccine hesitancy, COVID-19, risk perceptions, entertainment media, positive emotions

Feeling Inspired and Nostalgic: Associations between Media Context-Induced Positive Emotions and Behavioral Change among Vaccine-hesitant Individuals in the Late Stages of the COVID-19 Pandemic

Social media have become increasingly popular in today's media landscape. Social media are websites or applications wherein people can create and distribute content (e.g., photos and videos) and interact with others in real time (Fraser et al., 2020; Ksiazek et al., 2016). Data from the Pew Research Center show that 73 percent of U.S. adult population consume videos posted on YouTube, followed by Facebook and Twitter (69 percent and 22 percent respectively, Perrin & Anderson, 2019). Researchers have been interested in studying how and in what way social marketers and campaign planners might harness social media like YouTube to effectively disseminate health messages to target audiences (D'Souza *et al.*, 2020; Richardson *et al.*, 2011). However, much of the literature has focused on investigating the adverse effects of user-generated comments posted to health promotion videos on attempts to change behaviors (Dubé *et al.*, 2015; Lu and Sun, 2022). More specifically, substantial research has found the detrimental effect of oppositional and negative comments on persuasion outcomes of health promotional messages (Duong *et al.*, 2019; Kim *et al.*, 2021). Subsequently, recommendations to advertisers and social marketers have been centered on engaging in social media listening and monitoring to address public sentiments or limiting users' ability to provide divisive and opposition comments (Kim *et al.*, 2021; Walther *et al.*, 2010). Practitioners have found it more convenient to turn off user-generated comments than invest substantial resources to monitor and address public sentiments through comments (Labarre, 2013). For example, the Centers for Disease Control and Prevention (CDC) disables comments related to its Public Service Announcements (PSAs) posted on YouTube to communicate the COVID-19 vaccination messages. From this viewpoint,

user-generated comments responding to health promotion videos on YouTube tend to be seen as obstacles to practitioners' efforts to create behavioral change.

In this study, we view the combined entertaining and interactive nature of YouTube as opportunities to seek ways to promote health messages. This study explores YouTube entertainment music videos' comment boards as a potential space to disseminate health promotion messages rather than the conventional use of PSAs shared on YouTube. We consider consumers' emotional responses triggered by their entertainment media consumption as an inseparable component of the message reception context. Thus, this study examines whether and in what ways consumers' exposure to vaccination messages embedded in comments might be influenced by incidental and positive emotions induced from the immediate entertainment media consumption context. Findings offer practical and theoretical implications for social marketing practitioners and researchers seeking ways to utilize social media to persuade COVID-19 vaccine hesitant individuals in the late stages of the pandemic to change perspectives and behaviors.

Challenges to Changing Vaccine-hesitant Consumers' Behavior

While non-pharmaceutical measures such as social distancing and mask-wearing have helped to curb the COVID-19 pandemic's progression (CDC, 2023), long-term control of the pandemic requires high vaccination coverage to reach herd immunity (Chou and Budenz, 2022). When a sufficiently large percentage of the population gets vaccinated, the majority can become immune to the disease and thus minimizing the severity of the disease. To reach COVID-19 herd immunity, a high percentage of the population needs to be vaccinated (e.g., 75 - 90%, Anderson et al. 2020).

Although COVID-19 vaccination campaigns have been implemented in the U.S., the country still ranks second highest among high-income countries regarding vaccine hesitancy

(Aw *et al.*, 2021). *Vaccine hesitancy* is defined as the refusal or rejection of a vaccine when the vaccine is available (World Health Organization, 2019). It is important to note that vaccine-hesitant individuals cannot be viewed as a monolith because they come from varying cultural, political, and economic backgrounds. While vaccine hesitancy has been widely used to include individuals positioning on a continuum ranging between the full support and full rejection of vaccines (MacDonald, 2015), researchers have used specific terms to describe different individual groups within this continuum (e.g., the use of vaccine-resistant individuals to refer to people who strongly oppose vaccination, Ophir *et al.*, 2023). In the current study's context, we conceptualize vaccine-hesitant individuals as those who are reluctant to get fully COVID-19 vaccinated in the late stages of the pandemic, when the vaccine has been available for a while and that the majority of the population has been safely vaccinated (i.e., over 70 percent of Americans have been fully vaccinated, CDC, 2023).

Communicating the vaccination messages to vaccine-hesitant consumers at the late stages of the COVID-19 pandemic is challenging because this audience tends to have various concerns about getting vaccinated (Moran *et al.*, 2016). Vaccine-hesitant individuals may feel worried about the vaccines' side effects and uncertain about vaccine effectiveness (Fisher *et al.*, 2020). Moreover, the fast production of vaccines has led to vaccine skepticism that quickly spreads on mainstream and social media (Ball, 2020). Widespread conspiracy theories also cultivate disbelief about the vaccines' safety and efficacy (Walter *et al.*, 2022). Amid this circumstance, anti-vaccine groups have employed several strategies to promote skepticism toward public health messages (Moran *et al.*, 2016), including the sophisticated use of social media sites such as Facebook and Twitter to convey their anti-vaccination messages (Walter *et al.*, 2022).

Vaccine perceptions and behaviors have been intricately linked to American politics,

making it a complex issue that moves beyond simple public health concerns (Baumgaertner *et al.*, 2018). Research has found that ideological identification predicted COVID-19 vaccination in the U.S. (Brinson, 2022). For instance, in the first year of the pandemic, 52 percent of Democrats reported being willing to get the COVID-19 vaccines versus 26 percent of Republicans who were willing (SteelFisher *et al.*, 2021). In a way, the COVID-19 vaccination issue may be less important to this consumer group than maintaining attitudes consistent with their ideological views. Thus, vaccination messages aimed at vaccine-hesitant consumers are susceptible to being perceived as attempts to sway their ideologies, possibly resulting in psychological reactance.

Overcoming Vaccination Message Resistance Using Positive Emotions

A key concern for health promotion practitioners is overcoming message resistance without provoking maladaptive responses (Miller *et al.*, 2020). For instance, practitioners have commonly employed fear-based messages to promote COVID-19 vaccination (Son, 2021). Nevertheless, vaccine-hesitant consumers report little fear when viewing messages about COVID-19 infection (Willis *et al.*, 2021). Moreover, fear-based messages tend to communicate an apparent intent to persuade (Benoit, 1998). Past research has shown that the mere intent to persuade in messages can elicit emotional and cognitive resistance to messages (Ratcliff and Sun 2020). Moreover, fear-based messages can activate a “mistrust” schema wherein the audience recognizes the persuasive message and becomes mistrustful of the message (Miller *et al.*, 2020).

Considering that COVID-19 vaccine-hesitant consumers in the later stages of the pandemic tend to reject all vaccination messages regardless of message source credibility and strength of the arguments, researchers have suggested the use of positive emotions to persuading this consumer group (Chou and Budenz, 2020). According to the *hedonic contingency model* (Petty and Briñol, 2015; Wegener and Petty, 1994), positive emotions reduce the systematic

processing of persuasion messages because when people focus on achieving and maintaining their positive emotional state while also making sense of the meanings of such emotions to themselves, they prefer spending less cognitive efforts on processing messages. Moreover, as scrutinizing a persuasive message involves considerable cognitive attempts, it might be perceived as a threat to maintaining desirable positive emotions (Schwarz *et al.*, 1991; Wong and Householder, 2008). Thus, capitalizing on positive emotions might help to persuade difficult consumers, such as vaccine-hesitant consumers, who tend to react to vaccination messages opposing their ideological beliefs.

Research also shows that positive emotions tend to lift media consumers' spirits (Griskevicius *et al.*, 2010), increase appreciation and connectedness to others and motivate consumers to empathize with other people's circumstances, which might lead to changes in attitudes and behavior (Pascal *et al.*, 2002; Sierra and McQuitty, 2007). Furthermore, some specific emotions carrying mostly positive valence, such as nostalgia and inspiration, are powerful in motivating behavioral change (Winterich and Haws, 2011; Wyer *et al.*, 2019). In sum, this literature points to the possibility that positive emotions motivate people to relax and focus more on pertinent and easily comprehended cues in a message consistent with the hedonic contingency model. Thus, positive emotions might activate judgmental shortcuts to message processing, making people more prone to agree with a persuasive message's position despite its possible discrepancy with their pre-existing attitudes. Clearly, positive emotions are major outcomes of entertainment media consumption and YouTube as a popular social media platform can fulfill consumers' needs for positive affect.

Research has shown that music is the most prevalent cue in commercials (Chou and Lien, 2014). Advertisers ubiquitously employ music to promote a product knowing that it would

induce positive emotions while distracting consumers from scrutinizing the promotion message (Oakes and North, 2006). Additionally, studies have shown that music stimulates consumers' affective responses that can be utilized to enhance the effectiveness of advertisements (Kellaris and Cox, 1989; Park and Young, 1986). Commercials using music that resonate with consumers' personal experiences likely evoke more affective responses (Allan, 2006; Kellaris *et al.*, 1993). Thus, this study manipulated popular music videos shared on YouTube to create positive emotions and explore the effect of such emotions on COVID-19 vaccination behavior.

Formulation of Hypotheses

In this study, we posit that practitioners may consider utilizing YouTube's entertaining and interactive features to induce positive emotions and tailor health messages in user-generated comment boards to conceal the messages' persuasive intent and thereby, preventing consumers' psychological reactance. In contrast to research focusing on the persuasive impact of content or sources of PSAs posted on YouTube, this study considers circumstances when consumers experience positive emotions from viewing entertainment videos and then peer consumers' comments that implicitly promote health messages. Specifically, we explore whether and how entertainment media context-induced positive emotions can influence the persuasive outcomes of health promotion messages embedded within the media consumption context. Guided by prior research (Oliver and Raney, 2011), we first predict the following emotional outcomes of consuming entertainment media:

H1: Exposure to personally relevant entertainment music videos (vs. exposure to mundane videos) will lead to feelings of (a) inspiration, (b) hope, (c) nostalgia, (d) excitement, and (e) amusement.

Next, we hypothesize the effects of specific positive emotions on risk perceptions, which

is a typically desirable outcome of health promotion messages conducive to attitudinal and behavioral changes.

Inspiration. Inspiration is a prevalent emotional reaction to entertainment media consumption (Oliver *et al.*, 2012). Feeling inspired motivates people to perform good deeds to be better human beings. In the COVID-19 pandemic, research shows that inspiring Republican participants to think about human connections and prosocial orientations might motivate them to accept health messages advocating wearing face masks—a threatening behavior to their political ideology (Oliver *et al.*, 2022). Research has also shown that inspiration increases perceptions of COVID-19 risk (Yang, 2022). Thus, we hypothesize:

H2a: Inspiration will be positively associated with risk perceptions.

Hope. Hope is a future-oriented emotion reflecting one's longing for positive outcomes when the odds are not high (Lazarus, 1991). The core relational theme of hope is optimism and potential for success (Smith and Lazarus, 1993). Feeling hopeful can motivate an action tendency to reach success, and thus, it can be viewed as a feeling that drives positive future expectancies (Roseman, 2011). Research reveals that hope is associated with higher risk perceptions and behavioral intentions (Yang *et al.*, 2019). Thus, we predict:

H2b: Hope will be positively associated with risk perceptions.

Nostalgia. Nostalgia is a sentimental longing for the past (Sedikides and Wildschut, 2016), and it generally creates a positive feeling and appreciation of things in the past (Holbrook, 1993). Even when this emotional experience may remind people of bittersweet memories, it generally evokes positive sentiments such as optimism and meaningfulness (Menke, 2017). Advertising research shows that nostalgia can influence prosocial intentions (Ford and Merchant, 2010). Moreover, nostalgia appeals can be persuasive to increase favorable attitudes and

intentions to adopt health behaviors (Hussain and Alhabash, 2021). Among various nostalgia cues, music has been found as an important source for driving the feeling of nostalgia (Chou and Lien, 2014). Because people tend to remember more positive than negative memories (Chou and Lien, 2014), it is expected that such pleasant emotional experiences may motivate people to think more about the well-being of others and, in turn, attempt to align their risk perceptions to that of others. Thus, we hypothesize:

H2c: Nostalgia will be positively associated with risk perceptions.

Excitement. Feeling excited reflects a heightened affective state of enthusiasm and eagerness, thus carrying a positive valence. People tend to feel excited about something positive that they anticipate will happen in the future. Under the influence of this high-intensity emotion, people can be less critical of a persuasive attempt (Nabi and Green, 2015). Additionally, research in advertising shows that excitement can increase the tendency to accept adventurous and sensational ideas and products (Jayawardhena and Wright, 2009). Regarding message processing, people also likely engage in heuristic processing when feeling excited (Mitchell *et al.*, 2001). Thus, the existing feeling of excitement might lead people to be less critical of persuasive health messages and more likely to accept issues concerning the well-being of others. We hypothesize:

H2d: Excitement will be positively associated with risk perceptions.

Amusement. Amusement is an emotional reaction to a humorous or entertaining stimulus (Fredrickson, 2013). People feeling amused tend to find things interesting and relaxing, making it a positively-valenced emotion. Unlike feeling inspired and hopeful, however, feeling amused often does not motivate people to initiate behavior (Bartlett and DeSteno, 2006; Yang, 2022). As such, we ask:

RQ1: Will amusement be associated with risk perceptions?

The link between risk perceptions and attitudinal change has also been established in the health behavioral change literature (Fishbein and Ajzen, 2009). In the COVID-19 pandemic, studies have shown that risk perceptions are negatively associated with anti-vaccination attitudes (Attema *et al.*, 2021; Caserotti *et al.*, 2021). Studies also indicate that higher anti-vaccination attitudes reduce intentions to get vaccinated (Nan and Madden, 2012; Thaker, 2021). Thus, we predict:

H3: Risk perceptions will be negatively associated with anti-vaccination attitudes.

H4: Anti-vaccination attitudes will be negatively associated with vaccination intent.

As risk perceptions and attitudes have been found to mediate the association between media exposure, emotions, and behavioral intentions (Liu *et al.*, 2022; Morris *et al.*, 2002), this study tests a model hypothesizing the indirect effects of entertainment media exposure on intentions to get the COVID-19 vaccines as mediated through positive emotions, risk perceptions, and anti-vaccination attitudes through the below hypothesis:

H5: The association between entertainment media consumption on vaccination intentions will be mediated by (a) nostalgia, risk perceptions, and anti-vaccination attitudes, (b) hope, risk perceptions, and anti-vaccination attitudes, (c) inspiration, risk perceptions, and anti-vaccination attitudes, and (d) excitement, risk perceptions, and anti-vaccination attitudes.

We also ask:

RQ2: Will there be an indirect association between entertainment media consumption and vaccination intentions as mediated by amusement, risk perceptions, and anti-vaccination attitudes?

Methods

Design

This study was part of a larger online experiment using a 2 (entertainment media exposure vs. mundane media exposure) x 2 (high vs. low doses of counter-attitudinal comments) between-subject design. The original study included a control condition consisting of stand-alone vaccination messages. Doses of counter-attitudinal comments were defined as the number of comments subtly supporting COVID-19 vaccination (described below). As data showed a nonsignificant main effect of comment doses ($p = .56$) and a nonsignificant interaction effect between video conditions and the counter-attitudinal comment doses ($p = .87$), data in the four treatment conditions were collapsed into two conditions: entertainment video exposure and mundane video exposure. The control condition was excluded because it included fear-arousing messages that were not expected to arouse positive emotions.

Participants and Procedures

The study protocol received ethical approval from an Institutional Review Board. Vaccine-hesitant participants were recruited in early 2022 by CloudResearch--a participant-sourcing platform for online research (<https://www.cloudresearch.com>). Eligibility criteria were people who reported COVID-19 vaccine hesitancy, 18 years old or above, and residing in the U.S. Participants provided informed consent before participation and received \$2.00 in compensation.

As this study involved listening to music, participants were asked to indicate the specific music instrument (e.g., guitar, cello, piano) played in a short music file to confirm the availability of their speakers/headphones. Those who selected incorrect instruments were removed ($n = 14$). Participants were also removed if they had the same response patterns ($n = 13$), failed attention check items ($n = 33$), spent too much or too little time on the survey (3 SDs

below or above the mean, $n = 61$), indicated that they were fully vaccinated against COVID-19 in response to a post-test item asking about their vaccine status ($n = 8$), and failed to verify U.S. residency ($n = 9$). The working sample in this study included 409 participants. Table 1 reports participant demographics.

Participants were randomly assigned to one of the experimental conditions. Participants in the entertainment video condition viewed a favorite song of theirs, while those in the mundane video condition viewed a mundane video (description below). In the low doses of counter-attitudinal comment condition, participants viewed two comments with one comment implicitly suggesting the benefit of vaccination. Those in the high doses of counter-attitudinal comments condition viewed ten comments with two comments implicitly supporting vaccination. The comments in all treatment conditions were accompanied by equal numbers of likes and emojis to enhance ecological validity. Participants then responded to a questionnaire measuring key variables and demographics before being debriefed and exiting the study.

Stimulus Materials

In the entertainment video condition, a list of 50 popular music videos was created based on the Billboard 100. The list included the top 10 songs from each of the recent four decades (Table 2). Participants were first asked to choose their favorite music decade because research has shown that the period of the songs was an important factor in ensuring whether a song can evoke emotions (Chou and Lien, 2014). Participants were then asked to select one song that they perceived as positive and personally relevant to them. This process aimed to ensure that the videos resonated with participants' personal experiences to induce positive emotions as guided by prior research findings showing that higher advertising effectiveness was more likely achieved when popular songs were familiar to consumers (Chou and Lien, 2014). As for the

mundane video condition, participants viewed one of the three videos showing mundane scenes potentially inducing no, or very low, positive emotions (e.g., short documentary scenes of trees).

Regarding comment stimuli, a sample of existing comments posted to popular music videos on YouTube was selected and modified to meet the study's purposes and design. The top comments displayed stories about one of the video viewers losing their loved ones due to COVID-19. The comment suggested the benefits of vaccination, but its persuasive intent was not explicit to participants, and the manipulation made it look like a consumer's natural reaction to the videos. Appendix A illustrates a sample of comment stimuli.

Measures

Positive Emotions. Based on prior research (Dillard and Shen, 2007), positive emotions were measured on a scale from 1 (*None of this feeling*) to 7 (*A great deal of this feeling*) by asking participants to report their emotions while viewing the videos (inspired: $M = 3.83$; $SD = 1.94$, hopeful: $M = 3.78$; $SD = 1.91$, nostalgic: $M = 3.94$; $SD = 2.06$, excited: $M = 3.22$; $SD = 2.02$, and amused: $M = 2.98$; $SD = 1.94$).

Risk Perceptions. Four items adapted from prior research were used to assess risk perceptions related to COVID-19 disease (Liu *et al.*, 2022). Sample items were “*The COVID-19 is a serious health problem*” and “*I am susceptible to catching COVID-19 illness*” (1 = *strongly disagree*; 7 = *strongly agree*; $M = 4.47$; $SD = 1.46$; $\alpha = .84$).

COVID-19 Anti-vaccination Attitudes. COVID-19 anti-vaccination attitudes were measured using the validated generalized vaccine hesitancy scale (Shapiro *et al.*, 2018). This measure contained dimensions that encompassed misperceptions of rushed vaccine development, inadequate testing, and risk of taking the vaccines that were salient during the COVID-19 pandemic (Hrin *et al.*, 2022; Thaker 2021). Nine items were adopted to capture COVID-19 anti-

vaccination attitudes. Sample items were “*Not all vaccines offered by the government are beneficial*” and “*New vaccines carry more risks than older vaccines*” (1 = *strongly disagree*; 7 = *strongly agree*; $M = 5.12$; $SD = 1.22$; $\alpha = .90$).

Intentions to Get COVID-19 Vaccines. Intentions to get COVID-19 vaccines were measured using three items (Nan and Madden, 2012). Samples items were “*How likely would you be to get fully vaccinated against COVID-19 in the next 6 months?*” and “*How likely would you be to get fully vaccinated against COVID-19 sometime soon?*”(1=*very unlikely*, 7= *very likely*; $M = 2.83$; $SD = 1.97$; $\alpha = .96$).

Demographics. Age, sex, race/ethnicity, education, income, and political views were measured. Measurement scales were included in Appendix B.

Data Analysis

To test the hypotheses, a path analysis using structural equation modeling (SEM) with maximum likelihood estimation methods was conducted. The model tested positive emotions, risk perceptions, and anti-vaccination attitudes as joint-mediating mechanisms linking media consumption and vaccination intentions. Demographics were included as covariates. The positive emotions were allowed to covary. Model fit was assessed using the Hu and Bentler’s (1999) fit criteria. All analyses were conducted using Stata SE 16.1.

Results

Induction Check

Following O’Keefe’s (2003) recommendations, the measures of positive emotions were used as the manipulation check and mediators for testing hypotheses. To assess whether positive emotions were induced, a one-way multivariate MANOVA was conducted to compare the two conditions (entertainment vs. mundane videos). The MANOVA was significant, Wilks $\Lambda = .698$,

$F(10, 398) = 17.213, p < .001, \text{partial } \eta^2 = .30$). Results showed significant differences between mundane video and entertainment video conditions regarding nostalgia, hope, inspiration, amusement, and excitement, indicating that the induction was successful (Table 3).

Hypothesis Testing

Table 4 shows correlations among variables. The initial model did not show a good fit of the model to the observed data, $\chi^2(31) = 84.653, p < .001, \text{CFI} = .96, \text{TLI} = .89, \text{RMSEA} = .07$ (90% CI = [.049, .082]), SRMR = .04. Modification indices suggested that the model fit would be improved if risk perceptions were specified to have a direct association with intentions. As this path was theoretically plausible (Rimal et al., 2009), the model was re-estimated adding the path between risk perceptions and vaccination intentions. SEM results showed that the modified model fit well with the data, $\chi^2(30) = 31.007, p = .42, \text{CFI} = .99, \text{TLI} = .98, \text{RMSEA} = .01$ (90% CI = [.001, .039]), SRMR = .03.

H1 predicted that exposure to entertainment music videos (vs. exposure to mundane videos) would lead to feelings of inspiration, hope, nostalgia, excitement, and amusement. *H2* predicted that four positive emotions, including inspiration (*H2a*), hope (*H2b*), nostalgia (*H2c*), and excitement (*H2d*) would be positively associated with risk perceptions. *RQ1* asked if amusement would be associated with risk perceptions. As shown in Figure 1, *H1*, *H2a*, and *H2c* were supported while *H2b* and *H2d* were not. Results showed a nonsignificant association between amusement and risk perceptions (*RQ1*). *H3* posited that risk perceptions would be negatively associated with anti-vaccination attitudes, while *H4* hypothesized that anti-vaccination attitudes would be negatively associated with vaccination intent. Results showed support for *H3* and *H4*.

Based on *H2* results, only *H5a* and *H5c* were examined in the mediation analysis.

Specifically, *H5a* posited that inspiration, risk perceptions, and anti-vaccination attitudes would mediate the association between video consumption and vaccination intentions. Additionally, *H5c* hypothesized that nostalgia, risk perceptions, and anti-vaccination attitudes would mediate the association between video consumption and intentions. Results supported *H5a* ($\beta = .05$, $SE = .02$, 95% CIs = [.006, .098]) and *H5c* ($\beta = .03$, $SE = .01$, 95% CIs = [.002, .054]).

As risk perceptions were positively associated with intentions, the indirect association between video consumption and vaccination intentions through inspiration and risk perceptions, and through nostalgia and risk perceptions were also examined. Results revealed that these indirect pathways were statistically significant ($\beta = .11$, $SE = .05$, 95% CIs = [.015, .199] and ($\beta = .06$, $SE = .03$, 95% CIs = [.002, .110], respectively). The direct association between video consumption and intentions was nonsignificant ($\beta = -.07$, $SE = .04$, 95% CIs = [-.165, .010]).

Discussion

This study examined the association between positive emotions deriving from consuming entertainment music videos posted on YouTube on vaccination promotion messages embedded in user-generated comments among a sample of vaccine-hesitant consumers. Results revealed that entertainment media context-induced positive emotions, including nostalgia and inspiration, were influential. Specifically, vaccine-hesitant participants viewing an implicit vaccination message when they felt nostalgic or inspired tended to experience higher risk perceptions than those who did not feel so. Feeling nostalgic tends to bring about fondness and meaningfulness deriving from thoughts related to memorable times in the past (Holbrook, 1993). Because such memories commonly contain more positive features (e.g., happy, warm, pleasant) than negative features (e.g., sad, regretful; Abeyta *et al.*, 2015), feeling nostalgic motivates an approaching tendency to empathize with others and express a willingness to engage in advocated behaviors

(Hussain and Alhabash, 2021). Similarly, inspiration carries positive valence that tends to induce appreciation and compassion (Oliver *et al.*, 2012). Research has shown the effect of feeling inspired on complying more with COVID-19 messages (Oliver *et al.*, 2022). Thus, feeling nostalgic or inspired could have motivated participants to empathize with the loss of other viewers who told about their significant others dying of COVID-19. Perhaps as they did so, they became more receptive to the position of the implicit health message and perceived a higher level of COVID-19 threat to themselves.

Simultaneously, data showed that amusement, excitement, and hope were not associated with risk perceptions. Amusement is a common emotional reaction to a humorous stimulus associated with a sense of contentment (Fredrickson, 2013). Prior research has shown that amusement tends to be a fleeting emotion with a low action tendency (Bartlett and DeSteno, 2006; Yang, 2022), which probably explained why this feeling did not motivate participants to change their cognitive evaluations of the related risk. Excitement also did not change participants' risk perceptions. We suspected that excitement might motivate people to focus on sensation-seeking behaviors rather than preventive health behaviors. For instance, research found that excitement likely motivates consumers to engage in adventurous and sensational ideas and products (Jayawardhena and Wright, 2009; Tellis *et al.*, 2019). Moreover, although the literature suggested that hope is an emotion associated with goal-directed and coping actions that can motivate positive expectations of future events (Lazarus, 1991), results showed that hope was not associated with risk perceptions. We speculated that as inspiration and nostalgia were major emotions aroused by the entertainment stimuli, these emotions were overwhelmingly felt to the extent that they became powerful in influencing risk perceptions. Indeed, data revealed that participants reported inspiration and nostalgia as the highest among all positive emotions.

Data indicated two mediation pathways through which music video consumption could influence vaccination intentions. The first was through positive emotions (i.e., inspiration and nostalgia) and risk perceptions. The second was through positive emotions, risk perceptions, and anti-vaccination attitudes. Either way, these findings supported the influential role of risk perceptions in linking positive emotions and vaccination intentions. In other words, consuming entertainment music videos on YouTube could produce positive emotions that changed participants' perceptions of the COVID-19 risk, making them agree with the risk message's position and recognize that they were more vulnerable to the disease. This cognition change, in turn, influenced vaccination attitudes and behavior.

Implications for Social Marketers

Campaign practitioners may attempt to increase risk perceptions to motivate health behavioral change by inducing fear despite its potential problematic outcomes (Hastings *et al.*, 2004). Capitalizing on fear might not be a practical long-term vaccination promotion strategy because fear tends to decline in the late stages of an infectious pandemic (Gidengil *et al.*, 2012). Moreover, focusing solely on promotional messages such as PSAs posted on social media might lead to the negligence of other scintillating media stimuli abundant in social media environments, such as the availability of user-generated comments (Duong *et al.*, 2021; Lu and Sun, 2022). Findings from this research showed that leveraging entertainment media context-induced positive emotions might be efficacious in promoting vaccination messages in the later stages of the COVID-19 pandemic. These findings were notable given that this study was conducted during the late stages of the COVID-19 pandemic in the U.S., where the vaccines have been rolled out for a relative long time and a large population has been safely vaccinated (i.e., high efficacy of the vaccines and existing favorable social norms). Additionally, vaccination

campaigns have offered rewards to encourage the behavior, such as free vaccine shots and significant cash incentives (e.g., the “Vax for the Win” campaign stated that any Californian ages 12 or over who had at least one dose of the vaccine would be eligible to win cash prizes of 1.5 million USD, National Governors Association, 2021). It is obvious that individuals who still refused vaccination at the late stages tend to be those who were not easily persuaded by these promotional tactics. As such, the current study’s findings showing changes in COVID-19 vaccination attitudes and behavioral intentions should be encouraging for practitioners to consider opportunities and development of vaccination behavioral change campaigns.

Findings were consistent with scholars’ suggestion that social marketers should consider tailoring health promotion messages to entertainment media to stimulate behavioral change (Kotler and Lee, 2008). In the context of social media entertainment where user-generated comments can be an important part of individuals’ entertainment media consumption experiences, social marketers might consider utilizing the comment boards to integrate their health promotion messages. This can be performed in certain ways, including through social marketers running campaigns to encourage people to share their meaningful stories related to COVID-19 (e.g., stories about the illness of their own, friends, or family members along with supportive comments regarding vaccination) in entertainment videos’ comment boards posted on social media sites. As online comments can be perceived as public opinions that have potent social influence on consumers in the COVID-19 pandemic context (Duong et al., 2022; Lu and Sun, 2022), social marketers might leverage the combined effect of entertainment media-induced positive emotions and comments to motivate behavioral change.

Campaigners might also need to pay attention to designing messages eliciting positive affects and favorable perceptions of humanity, rather than messages that arouse negative

emotions and convey explicit persuasive intents (Myricks and Oliver, 2015). That way, vaccine-hesitant consumers might be less likely to engage in counter-arguing against the pro-vaccination message position (Ko et al., 2023). More research is needed to understand the influence of positive emotions deriving from entertainment media consumption in the context of vaccine hesitancy to provide specific and insightful practical implications. This experiment, however, has provided a promising starting point toward this important goal.

Limitations and Future Research

This study has several limitations. First, as we aimed to explore a novel way to promote the vaccination messages to vaccine-hesitant consumers at the later stages of the COVID-19 pandemic, the study design required complex manipulations to connect video consumption to promotion message exposure without triggering awareness of the objective of the study (i.e., testing effect). Therefore, we could not measure existing levels of vaccination message resistance to compare possible attitudinal changes. Second, there can be other emotional responses that could be elicited from consuming entertainment media that we did not investigate. Third, message effect results should be interpreted in the sense of the relative effect between personally relevant entertainment video consumption versus mundane video consumption. Fourth, how long positive emotions might affect cognitive responses such as risk perceptions and attitudes remain an empirical question begging for longitudinal studies. Future work is needed to replicate these findings and support social marketers to effectively utilize social media to the advantage of important health promotion campaigns.

Conclusion

Research has documented that consumers tend to react to a health promotion message when it is perceived to have the intent to change thoughts and behaviors, when there is a

discrepancy between the message's advocated behavior and pre-existing attitudes toward the behavior, and when the behavioral change requires a change in ideological beliefs. A health promotion message is very likely rejected if it meets all these three factors. Current COVID-19 vaccination campaigns aiming at changing attitudes and behavior of vaccine-hesitant individuals in the late stages of the pandemic are a telling example illustrating this challenging context. This study employed a design that mirrored the daily consumption of entertainment media and found support for the possibility of utilizing entertainment media context-induced emotions to promote vaccination messages.

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Table 1.
Participants' demographics

	Sample (N = 409)
Average age (SD)	42.61 (22.65)
Biological sex, n (%)	
Male	153 (37.4%)
Female	256 (62.6%)
Race	
Asian American	5 (1.2%)
Black	55 (13.4%)
White	299 (73.1%)
Hispanic	20 (4.9%)
Native	4 (1%)
Other	12 (2.9%)
Mixed	14 (3.4%)
Education, n (%)	
Grade school	1 (.2%)
Some high school	22 (5.4%)
Completed high school	130 (31.8%)
Some college or technical school	183 (44.7%)
Completed 4-year college or university	58 (14.2%)
Post-graduate education	15 (3.7%)
Household income, n (%)	
Median	30,000 - 39,999
< 20,000	110 (26.9%)
20,000-29,999	73 (17.8%)
30,000-39,999	54 (13.2%)
40,000-49,999	47 (11.5%)
50,000-59,999	49 (12%)
60,000-69,999	23 (5.6%)
70,000-79,999	11 (2.7%)
80,000-89,999	10 (2.4%)
90,000-100,000	9 (2.2%)
> 100,000	23 (5.6%)
Political view, n (%)	
Very conservative	69 (16.9%)
Somewhat conservative	73 (17.8%)
Moderate	206 (50.4%)
Somewhat liberal	36 (8.8%)
Very liberal	25 (6.1%)

Table 2.*Music video stimuli*

1970-1979	Let it be; You've got a friend; American Pie; Killing me softly with his song; Rhinestone cowboy; Hotel California; Torn between two lovers; You needed me; Too much heaven; How deep is your love.
1980-1989	Heaven; Eternal flame; Hard to say I'm sorry; Island in the stream; Time after time; Careless whisper; True color; With or without you; Foolish beat; I'll be there for you.
1990-1999	Endless love; How am I supposed to live without you; Save the best for last; Hero; The power of love; I swear; Wannabe; I don't want to miss a thing; You're still the one; Have you ever really love a woman?
2000-2009	If I die young; Drops of Jupiter; A thousand miles; When I'm gone; Via La Vida; We belong together; Cowboy takes me away; Irreplaceable; No one; I'm yours.
2010-2019	All of me; Rolling in the deep; Shape of you; Despacito; When I was your man; Need you now; See you again; Hello; Oldtown road; Perfect.

(Source: Authors' own work)

Table 3.
MANOVA results

Emotions	Mundane video consumption ($n = 204$) (M/SD)	Entertainment video consumption ($n = 205$) (M/SD)	$F(1,407)$	Partial η^2
Nostalgic	3.18/1.79	4.69/2.04	63.626***	.14
Hopeful	3.22/1.69	4.34/1.96	38.764***	.09
Inspired	2.97/1.71	4.68/1.80	96.980***	.19
Excited	2.31/1.66	4.13/1.94	103.278***	.20
Amused	2.35/1.61	3.60/2.05	47.216***	.11

*** $p < .001$

(Source: Authors' own work)

Table 4.
Bivariate correlations among variables

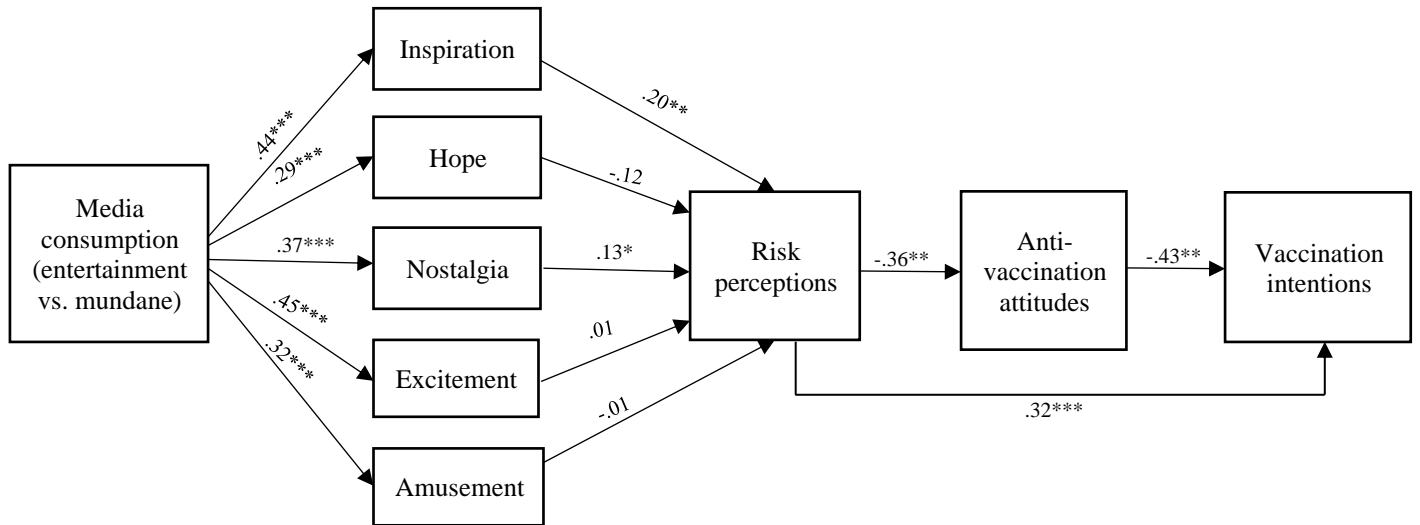
	1	2	3	4	5	6	7
1. Nostalgic	-						
2. Hopeful	.39**						
3. Inspired	.47**	.71**					
4. Excited	.33**	.60**	.69**				
5. Amused	.28**	.49**	.53**	.62**			
6. Risk perceptions	.16**	.05	.17**	.11*	.08		
7. Anti-vaccination attitudes	-.05	.02	-.06	-.04	.01	-.37**	
8. Vaccination intentions	.07	.14**	.17**	.14**	.13**	.48**	.54**

* $p < .05$; ** $p < .01$

(Source: Authors' own work)

Figure 1.

Results of the structural model (standardized estimates reported; * $p < .05$; ** $p < .01$; *** $p < .001$)



(Source: Authors' own work)

Appendix A

Sample Comment Stimuli with Embedded Vaccination Messages

11 comments SORT BY

Add a public comment...

B Blue Violet
I feel sleepy...
564 REPLY

J James Brown
This video reminds me of my wife. We used to sit together to listen to the rhythm of the rain and wind. Our 36-year love story ended unexpectedly when she died of COVID-19...It was very hard. No one was allowed to go in with her or be with her. She died all alone. She fought the disease for nearly a month until the end came. I have cried many times for the woman I loved is gone. I wish she had taken the vaccine to help her fight the virus. It might have saved her life.
8454 REPLY

J Jordan Smith
I feel what you feel. I'm sorry for your loss, friend.
2454 REPLY

R Robert Rodriguez
I am sorry for your loss. That's all I can say. Life can be so short.
1678 REPLY

M Maria Garcia
Wishing you all the best. We are fortunate that the vaccine is available for us.
1123 REPLY

J John Smith
H.O.P.E.=Hold On Pain Ends.
765 REPLY

M Mary Johnson
Bless you. I came here for the music, but also to feel people's love and the meaning of life.
573 REPLY

W William
Tears fill my eyes... Prayers for you and yours.
134 REPLY

A Amahle Dlamini
I hope that you are okay! Sending love and prayers from far away South Africa.
99 REPLY

N Nightingale Melody
God bless you. Please accept my love and prayers.
78 REPLY

D David Martinez
Oh mine! There are no words, my tears just started flowing.
56 REPLY

11 comments SORT BY

Add a public comment...

B Blue Violet
This song is a masterpiece. It reaches my heart and transports me into such a beautiful melody. Just pure amazing!
564 REPLY

J James Brown
This song reminds me of my wife. We used to listen to this song together, and we love it so much. Our 36-year love story ended unexpectedly when she died of COVID-19...It was very hard. No one was allowed to go in with her or be with her. She died all alone. She fought the disease for nearly a month until the end came. I have cried many times for the woman I loved is gone. I wish she had taken the vaccine to help her fight the virus. It might have saved her life.
8454 REPLY

J Jordan Smith
I feel what you feel. I'm sorry for your loss, friend.
2454 REPLY

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Wishing you all the best. We are fortunate that the vaccine is available for us.
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God bless you. Please accept my love and prayers.
78 REPLY

D David Martinez
Oh mine! There are no words, my tears just started flowing.
56 REPLY

(Source: Authors' own work)

Appendix B

Measurement Scales

Positive emotions (1-None of this feeling; 7-A great deal of this feeling)

While watching the video, I felt...

...inspired

...hopeful

...nostalgic

...excited

...amused

Risk perceptions (1-strongly disagree; 7-strongly agree)

- The COVID-19 is a serious health problem
- I believe that the COVID-19 is a dangerous disease
- I am susceptible to COVID-19 infection
- If there is a COVID-19 positive case nearby, I will be susceptible to contracting it.

COVID-19 anti-vaccination attitudes (1-strongly disagree; 7-strongly agree)

- Not all vaccines offered by the government are beneficial
- New vaccines carry more risks than older vaccines
- Getting vaccines is a not the only way to protect myself from COVID-19
- I am concerned about serious adverse effects of COVID-19 vaccines
- Overall, government over hypes the need for vaccines
- Corporations manufacturing vaccines only care for profit
- I am uncomfortable getting vaccines that were rushed into production
- COVID-19 vaccines are not necessary for my health

COVID-19 vaccines are ineffective.

COVID-19 vaccination intentions (1=*very unlikely*, 7= *very likely*)

- If you were faced with the decision of whether to get fully vaccinated against COVID-19 this month, how likely is it that you would choose to get the vaccine?
- How likely would you be to get fully vaccinated against COVID-19 sometime soon?
- How likely would you be to get fully vaccinated against COVID-19 in the 6 months?