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Engagement with and persuasiveness of HPV vaccination promotion videos: an examination of narrative engagement theory

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ABSTRACT

The human papillomavirus (HPV) is the most common sexually transmitted infection in the United States (CDC, 2023). Although a vaccine for HPV exists, the vaccination rate in young adults is still staggeringly low. Therefore, the purpose of this study was to use Narrative Engagement Theory (NET; Miller-Day & Hecht, 2013) to examine what HPV videos young adults find most engaging and persuasive. Participants were 992 college students from a large Southwestern University who watched ten HPV videos designed to inform young adults about HPV. After each video, participants responded to questions that assessed engagement and persuasiveness and were provided space to write as much as they liked to elaborate on their answers. The results suggest that certain videos may be more effective in persuading young adults to receive the HPV vaccination.

The Centers for Disease Control and Prevention estimates that each year more than 46,000 cases of cancer are caused by the human papillomavirus (HPV) (Centers for Disease Control and Prevention [CDC], 2021, 2023). Unfortunately, more than 70 million Americans are currently infected with HPV, with an additional 14 million newly reported infections each year (CDC, 2023). HPV is the most common sexually transmitted infection among adults in the United States (CDC, 2023; Holman et al., 2014; Satterwhite et al., 2013) with oncogenic types of HPV accounting for most cases of cervical, vaginal, anal, head, and neck cancers (CDC, 2021, 2023; Viens et al., 2016). In fact, HPV is estimated to cause more than 11,000 cases of cervical cancer each year in the U.S., 4,000 women die of cervical cancer annually (CDC, 2021, 2023), and an estimated 196,000 cervical precancer cases are diagnosed each year in the U.S (McClung et al., 2019). There are treatments for cervical cancers and precancers, but they can limit women's ability to have children (CDC, 2021). Notably, although women are more likely to be HPV positive, men can also contract HPV and transfer the infection to their partners. Fortunately, an HPV vaccination exists and is 'more than 90% effective in preventing HPV-related cancers' (CDC, 2020, p. 1), but unfortunately, many young adults have not been vaccinated.

Although HPV vaccination rates increased among young adults from 13% in 2013 to 21% in 2018 (CDC, 2020), the vaccine's overall uptake remains low. This may be due to the fact that the vaccination includes a series of 2 (children up to age 14) or 3 shots (15 or older) and many people do not finish the series, thus limiting its effectiveness (Perkins et al., 2016). While the recommended and ideal age for vaccination is between ages 11 to 12 (CDC, 2023), individuals may receive the HPV vaccination up until the age of 46 (CDC, 2021, 2023). Given the ideal age for vaccination, HPV interventions frequently target parents (Theis et al., 2020). However, it is equally important to promote vaccination in young adults who did not receive the vaccination as a child and who may still benefit from catching

up on the HPV vaccination (CDC, 2020). Unfortunately, HPV vaccination initiation decreases with age as individuals move into late adolescence and early adulthood (Chao et al., 2010; Dempsey et al., 2011; Liddon et al., 2012). Therefore, it is important to understand ways to enhance vaccine promotion and HPV prevention efforts for young adults.

As young adults move into independent living situations away from their parents, they gain more responsibility for personal health-related decisions, including vaccination (DeLauer et al., 2020). To date, informative documents such as pamphlets and handouts are often used to disseminate HPV-related information to young adults in clinical settings. This type of health messaging can be overwhelming, difficult for people to understand, and challenging to recall (Goldsmith et al., 2007; Theis et al., 2020; Vadaparampil et al., 2016; Wigfall et al., 2020). For those young adults seeking information online, disparities in health literacy can impair an individual's ability to evaluate online textual information (Divianiet al., 2016). Thus, it is important to discover alternative modes for sharing health information about the vaccination such as personal narratives.

Specific to health messages, previous literature demonstrates that the use of personal narratives to convey such health messages is valuable (Ballard et al., 2020; Frank et al., 2015; Hinyard & Kreuter, 2007). An underlying goal of presenting health messages through narratives is often to persuade specific audiences to change health-related behaviors or attitudes based on hearing the experiences of others (Green, 2006; Ratcliff & Sun, 2020; Shen et al., 2015). As such, the use of personal narratives in health messaging is linked to the adoption of healthy behaviors, such as cancer screenings (Murphy et al., 2013), vaccination (Krakow et al., 2017), and safe sex practices (Donné et al., 2017; Kiene & Barta, 2003).

Meta-analyses on persuasive health messages reveal that narratives presented through visual media such as film and video lend to more substantial persuasion effects in comparison to other media or more didactic information-only materials (Ballard et al., 2020; Shen et al., 2015). Similar research on narrative persuasion also suggests that for personal narratives to impact affective and cognitive responses the audience must be engaged (Miller-Day & Hecht, 2013; Miller et al., 1998). Thus, the more engaged individuals are in the narrative, the more likely they will be persuaded by the narrative message (Miller-Day & Hecht, 2013). For an intervention to be effective it is important that they utilize narratives that are tailored to specific populations or groups of individuals in order to induce higher levels of engagement (Ou & Youngstedt, 2020).

Therefore, the use of personal narratives to convey HPV messaging may be a valuable approach to promote HPV vaccination and elicit attitude change (Frank et al., 2015; Hopfer, 2012; McQueen et al., 2011). However, to do this successfully, it is important to understand more about the HPV narratives themselves and assess what kinds of narratives lead to high levels of engagement in a young adult population and evaluate if higher engagement actually results in greater persuasion. Guided by narrative engagement theory (NET; Miller-Day & Hecht, 2013) the current study examines an existing narrative-based HPV prevention intervention to determine the efficacy of intervention materials to engage and persuade young adults.

Literature review

Barriers to HPV vaccination

To understand the most effective ways to inform and persuade young adults to become vaccinated, it is first essential to understand several existing barriers to vaccination. First, HPV does not always present with overt symptoms, causing many cases to go undiagnosed (CDC, 2023). Next, as previous research has found, the perceived financial burden or a lack of insurance coverage often acts as a barrier to vaccination (Luque et al., 2012; Quinn et al., 2012). Additional impediments to vaccination include fear of adverse side effects and stigmatization (Griffioen et al., 2012; Hopfer, Garcia, et al., 2017; Wilson et al., 2013). This may include that they might become sick or that they needed to receive the

vaccine because they are sexually active. Furthermore, the vaccine is often viewed as optional rather than highly recommended for everyone (Hughes et al., 2011).

Misconceptions and beliefs surrounding vaccination also act as a barrier to vaccine uptake (Albright & Allen, 2018; Gerend & Magloire, 2008; Hopfe et al., 2017). For instance, some believe that the vaccine is only for sexually active adults with multiple partners (Albright & Allen, 2018). As a result, many individuals in a committed romantic relationship or who are not sexually active view the vaccine as unnecessary (Hopfer, Ray, et al., 2017). Some individuals also believe that other safe practices, such as condom usage, protect them fully from contracting HPV (Staggers et al., 2012). Although the use of condoms can decrease the risk of contracting HPV, the infection can still spread to areas that the condom does not cover (CDC, 2016). Thus, the CDC (2022) explains that vaccination is the most effective way to protect oneself against HPV's life-threatening infection.

Furthermore, healthcare providers do not always discuss HPV or vaccination with patients during their visits (Goff et al., 2011). The same is true for women in college who often use their campus health services and yet did not receive any information about sexual health (DeLauer et al., 2020). Although young adults gain more independent health-related responsibility as they transition into adulthood, many young adults still rely on their parents for health information and making health-related decisions (DeLauer et al., 2020). This may be because if a parent does not endorse a vaccine, then late adolescents and young adults are less apt to vaccinate later on in life (Ragan et al., 2018). Additionally, limited knowledge about HPV, its prevalence, associated risks, and parental support for the vaccine are primary barriers to vaccination (Litton et al., 2011; Tsui et al., 2013). Therefore, although health interventions and prevention education programs have been established to enhance HPV understanding (Cates et al., 2018; Frank et al., 2015; Hopfer, Ray, et al., 2017; McQueen et al., 2011), given the continued prevalence of such barriers, additional research on persuasive HPV messaging is needed to develop more effective interventions.

Narratives in health communication

Human beings are natural storytellers (Fisher, 1985) who utilize narratives to share meaning and make sense of experiences (Fisher, 1984, 1999). From a health communication perspective, the term *narrative* refers to storylines, characters, and messages about health-related behaviors (Hinyard & Kreuter, 2007; Kreuter et al., 2007). In alignment with traditional storytelling, health narratives have a distinct beginning, middle, and end (Hinyard & Kreuter, 2007; Moyer-Gusé & Nabi, 2010). Narratives provide audiences with models for healthy behaviors (Hinyard & Kreuter, 2007; Miller-Day & Hecht, 2013), which prompts viewers' health-related reflections and decision-making (Fisher, 1999; Hamby et al., 2018). The ability to strategically embed health messages into stories make narratives a practical approach to intervention and prevention efforts (Green, 2006; Lee et al., 2011; Miller-Day & Hecht, 2013; Miller et al., 1998).

In addition to attitude and behavior change, narratives can enhance overall knowledge about an illness or preventative actions (Hopfer, Ray, et al., 2017; Murphy et al., 2013). Because of this, they can also help change unhealthy behaviors by demonstrating that such actions are not normative, despite prior perceptions (Moyer-Gusé, 2008). Viewers often connect cognitively and emotionally to narrative messages and the characters' experiences more so than if they were just presented with information that may require higher levels of health literacy (Ballard et al., 2020; Kahn et al., 2008; Murphy et al., 2013), helping address common health disparities. Thus, health education messages presented in narratives also allow for connections with populations that are typically more difficult to reach (Hopfer & Clippard, 2011; Miller-Day & Hecht, 2013). Previous studies found that even vaccinated individuals reported limited knowledge about HPV and the vaccine itself (Albright & Allen, 2018; DeLauer et al., 2020). Therefore, educational health messages are necessary to disseminate more effective HPV messaging, and narratives provide a way to reach those less involved in healthcare or with lower levels of knowledge (Hopfer & Clippard, 2011; Miller-Day & Hecht, 2013).

Additionally, the ability to target specific populations (i.e., African American women, Ballard et al., 2020; Mexican American women, Frank et al., 2015) through culturally grounded narratives leads to greater persuasion (Larkey & Hecht, 2010; McFarlane & Morgan, 2020). However, because there is no one standard narrative or story that is more or less effective with young adults, the design and delivery of health narratives are crucial to its impact on the targeted audience (Frank et al., 2015; Krakow et al., 2017). The more viewers relate to the character or overall storyline, the higher the persuasive effects of the message (Frank et al., 2015; Kiene & Barta, 2003). Thus, researchers suggest that when an individual watches a narrative involving a character who resembles a member of the viewers' specific community, culture, or themselves that they are more likely to be engaged and persuaded to accept health information (Hamby et al., 2018; Houston et al., 2011; McQueen et al., 2011; Moyer-Gusé, 2008; Ratcliff & Sun, 2020). Health narratives are developed from personal accounts of actual experiences that are modified to deliver a health message to a targeted audience while maintaining as much original content as possible (Houston et al., 2011; Larkey & Hecht, 2010).

Several elements of a story influence the narrative's success in engaging an audience, such as the setting, source of health-related information, and length (Hopfer, 2012; Lewis, 2015; Ratcliff & Sun, 2020). Prior research suggests that individuals seek health information or support in decision-making from friends, family, and healthcare providers (Gerend & Shepherd, 2012). Specific targeted audiences might view HPV conversations with family members, medical experts, or peers differently (Hopfer, 2012; Kahn et al., 2008; McFarlane & Morgan, 2020). Therefore, a narrative approach to conveying health information requires consideration of the specific audiences' characteristics and norms to allow for greater engagement in the story (Lewis, 2015; Shin et al., 2018).

A significant challenge of employing persuasive health messaging is overcoming individuals' resistance or counterarguing (McQueen et al., 2011; Slater & Rouner, 2002). People are often resistant to explicit health messages because of perceived invulnerability to adverse outcomes (Krakow et al., 2017; Moyer-Gusé, 2008; Slater & Rouner, 2002). In comparison to non-narrative presentations of health information, narratives are a subtler form of persuasion because the messages are entrenched in the story and experiences of relatable characters (Kreuter et al., 2007; Moyer-Gusé, 2008; Moyer-Gusé et al., 2011). The more engaged an audience is in the narrative, the less resistant they will be to the delivered health message (Ratcliff & Sun, 2020). Thus, narratives are useful in overcoming resistance to health promotion messages because audiences are involved in the story, and persuasive efforts are less recognizable (Hinyard & Kreuter, 2007; Kreuter et al., 2007). This is especially salient because HPV literature suggests that individuals are often resistant to vaccine-related messaging for myriad reasons, including concerns about safety or stigmatization (Hopfer & Clippard, 2011). Thus, exploring the most effective ways to engage at-risk audiences, such as college students, is critical.

Narrative engagement theory

Narrative Engagement theory (NET) posits that a narrative's power is based on its ability to engage the audience (Miller-Day & Hecht, 2013). Through the years, the term *engagement* has been conceptualized in a variety of ways. Green et al. (2002) defines it as the level of attention to the message within the narrative (Green et al., 2002). However, Miller et al. (1998) and Miller-Day and Hecht (2013) argue that engagement exists on a continuum from high to low cognitive and emotional distance from the narrative and can be measured by an audiences' *interest* in the narrative, perceived *realism*, and *identification* with characters. An individual's interest relates to their overall involvement and attention to the story (Green, 2006; Lee et al., 2011; Miller et al., 1998). To be engaged in a narrative, this means that the audience views the story as authentic or realistic, and can connect to the plot (Lee et al., 2011; Miller et al., 1998). Furthermore, engagement relates to the audience's perceived similarity or identification with the characters (Miller et al., 1998). In developing stories to convey health messages, interest, realism, and identification should be considered, to allow for high levels of engagement (Lee et al., 2011). Individuals who are engaged in the narrative are more likely to connect or attend to the health message and be persuaded to change behavior (Miller-Day & Hecht, 2013).

In applying NET, prior studies consistently found that higher engagement levels were associated with more substantial persuasive effects (McQueen et al., 2011; Miller-Day et al., 2015; Shin et al., 2018). Narrative engagement leads to higher perceived risk and susceptibility, positively influencing prevention attitudes and behaviors (Hopfer & Clippard, 2011; McFarlane & Morgan, 2020; Nan et al., 2017). In the case of HPV messaging, low perceived susceptibility to HPV is often a barrier to vaccination because individuals may think that their relationship status or sexual history makes the vaccine unnecessary (Vorpahl & Yang, 2018). In identifying with characters or the experience within a narrative (Miller et al., 1998), individuals are likely to view themselves at heightened risk and therefore be persuaded by the health messages (Hopfer & Clippard, 2011; McFarlane & Morgan, 2020; Nan et al., 2017). As such, narrative effects will be strongest when viewers are engaged (Miller-Day & Hecht, 2013). For example, when assessing the effectiveness of narratives in anti-drug interventions, researchers found that both affective and cognitive responses to the stories were influenced by viewers' engagement (Banerjee & Greene, 2012; Miller-Day & Hecht, 2013; Shin et al., 2018).

Engaging narratives are particularly useful in persuading individuals to change health attitudes and behaviors (Miller-Day & Hecht, 2013; Miller-Day et al., 2015; Shin et al., 2018). Although some prior research focused explicitly on the use of narratives in presenting HPV information (Hopfer, 2012; Kahn et al., 2008; McFarlane & Morgan, 2020; Nan et al., 2017), the need for improved prevention and intervention remains essential, as the STI continues to be a widespread health issue (CDC, 2016). When comparing individuals' responses to different forms of health message delivery such as informative versus narrative, participants who received the personal narrative intervention scored higher on behavioral skills than those that received information via text with graphics or those in the control group (Kiene & Barta, 2003). Nonetheless, although studies have found that narratives are successful in engaging specific audiences (Hopfer, 2012; Nan et al., 2017; Ratcliff & Sun, 2020), limited research has examined the actual narratives, story elements, and messaging. Thus, the present study seeks to determine what HPV narratives lead to the highest level of engagement and persuasion among college students.

HPV stories






An HPV narrative-based intervention called 'HPV Stories' was developed in 2019 and, at the time of this writing, includes one introductory informational video and 9 narrative videos designed to promote HPV vaccination and provide health information pertaining to HPV (see Table 1). This narrative-based video intervention is intended for implementation in clinical settings or dissemination by health care providers. An early version of the program implemented in university health clinics resulted in nearly doubling the uptake of the vaccine among college students (Hopfer, 2012). The goal of this study is to examine both engagement and persuasiveness of 'HPV Stories' among college-aged women. Therefore, we pose the following hypothesis and research questions:

H1: There will be a positive association between video engagement and persuasiveness.

RQ1: Which HPV vaccination promotion videos were most engaging?





RQ2: Which HPV vaccination promotion videos were most persuasive?

Table 1. HPV stories' video descriptions.

	Video Name	Storyline	Who	Length
	Introduction- Informational video/non- narrative	Individuals talking to the camera defining HPV and sharing public health information such as definitions of HPV, prevalence of HPV-related cancers, and promoting the safety of the vaccine. Tag lines: 'Don't wait to vaccinate. Protect yourself against HPV-related cancers. Protect your partner too.'	6 young women, 1 female doctor, and 2 young men. Multiple ethnicities.	.44
PEER NARRATIVE VIDEOS				
	Rural	2 female high school seniors unpacking a pickup truck for summer tubing on the river. One girl who is a soccer coach discusses how she had to go to her doctors that day for a TB shot and her doctor mentioned the HPV vaccine. Her friend asks, 'What's that?' and the girl explains the cancers related to HPV and the number of shots needed as an adult. The friend shares that 'My uncle had oral cancer and it was bad. Maybe I should look into getting the shot.' The girl supports her friend and says, 'being protected from cancer is totally worth it.' Tag lines: 'Don't wait to vaccinate. Protect yourself from HPV-related cancers. Protect your partner too.'	2 female friends, high school seniors. Caucasian.	1.18
	Friends at the Pool	Two young adult friends talk poolside. Friend #1 who is in a committed relationship with another women discusses that she and her partner want to have a baby and they got vaccinated as part of staying healthy. Friend #2 admits that she did not think HPV was serious, but Friend #1 points out all of the cancers that are related to HPV. Friend #2 states that she is going to make an appointment to get vaccinated next week. Tag lines: 'Don't wait to vaccinate. Protect yourself from HPV-related cancers. And tell your friends too.'	2 young women of color. One identifies as lesbian.	1.22
	Basketball	Two late adolescent males are playing basketball when Friend #1 says that his girlfriend told him that he gave her HPV. Friend #2 didn't know what that was and says 'I'm not into shots.' Friend #1 talks about HPV-related cancers, genital warts, and the need for the vaccine. Friend #2 makes a basket and states that now he is 'all about the shots.' Tag lines: 'Don't wait to vaccinate. Protect yourself against HPV-related cancers. Protect your partner too.'	2 high school aged boys. One African American and the other Caucasian.	1:30
	Boba	Two young adult women leaving a college lecture, getting boba and talking. Friend #1 wasn't in class the previous day because she had been to her gynecologist and received her HPV vaccine. Friend #2 shared that she received hers at age 12. They discuss how their moms don't even want to talk about their daughters having sex so Friend #1 was surprised, but pleased, that her friend was vaccinated. Tag lines: 'Don't wait to vaccinate. Ask your doctor about the HPV vaccine. And tell your friends to vaccinate.'	2 Asian American young adult women.	.58


(Continued)

Table 1. (Continued).

	Video Name	Storyline	Who	Length
	Girlfriends	Two young adult women friends sit in a car because friend #1 is taking friend #2 to her doctor's appointment for her pap smear. Friend #1 discloses that she had the HPV vaccine because she had a previous cervical cancer scare. Friend #2 decides to ask her doctor about the HPV vaccine. Tag lines: 'Don't wait to vaccinate. Ask your doctor about the HPV vaccine. And tell your friends to vaccinate.'	2 Caucasian young adult women	1:04
	Little Saigon	A young adult male and young adult female sit in a public space in Little Saigon. The female friend asks the male if his birthday is coming up and points out that their friends just went and got their HPV shot while they could still be covered under their student insurance. They discuss HPV-related cancers and the male admits that he thought HPV was only a concern for females. The female dispels this assumption and says that they should go together to get their shots. He agrees but then warns, 'For her next birthday he is going to have her get the flu shot.'	1 young adult Asian male and 1 young adult Asian female	1.19
PARENT NARRATIVE VIDEOS				
	Mother-Adult Daughter Conversation	A young Latina woman approaches her mother sitting at a kitchen table asking her, 'Why do you look so sad?' and the mother replies that 'Tia (Aunt) Maria' was diagnosed with cervical cancer from HPV. The daughter empathizes with her mother and then points out that she was learning about the HPV vaccination in a college classroom. They discuss the safety of the vaccine and the daughter expresses a desire to get vaccinated. The mother reconsiders her position about non-vaccination. Tag lines: 'Protect yourself and your family. Ask your doctor about the HPV vaccine. The HPV vaccine can prevent many types of cancers in young men and women.'	1 Latina daughter, early 20's. 1 Latina mother, 40's.	1.17
	Mothers: Folklorico	At a dance rehearsal for Folklorico, preteen daughters are dancing and three Latina mothers are talking. Mother #1 says that she had taken her daughter to the doctor that morning to get back-to-school shots. Mother #2 shares that she had taken her daughter the previous week and the doctor recommended the HPV vaccine. She asks mother #1 if her daughter received the vaccination. Mother #1 replied that her sister had made her own daughter get the vaccine and that it is safe and so she was comfortable getting that vaccine for her daughter. They discuss ages for vaccination, different HPV-related cancers, and mother #1 states that she ended up getting both her daughter and son vaccinated. Mother #3 and Mother #2 state that they are going to make sure their daughters are vaccinated. Tag lines: 'Protect your kids. Ask your doctor about the HPV vaccine for your children.'	3 Latina mothers, mid-30's, early 40's	1:30

(Continued)

Table 1. (Continued).

	Video Name	Storyline	Who	Length
	Parents: Diner	2 sets of parents talking over dinner at a diner. One mother, who is also a nurse, brings up that the daughter of a friend was recently diagnosed with cervical cancer caused by HPV. One of the dad's asks, 'What's HPV?' They discuss HPV-related cancers and says that she had both her son and daughter vaccinated. The other dad expresses surprise and states that 'I thought the vaccine was just for girls.' After dispelling that assumption, the other mother states that 'after talking with you guys, I'm going to talk to my doctor about [vaccinating my two teens].' With the nurse/mom saying, 'I think that's a great idea.' Tag lines: 'Protect yourself and your family. Ask your doctor about the HPV vaccine. The HPV vaccine can prevent many types of cancers in young men and women.'	Two sets of Caucasian parents in their 40's	1:15

Methods

Message design process for "HPV stories" videos

The narrative health messages created for this study included ten videos (44 seconds to 1.30-minutes in length) collectively called 'HPV Stories' where individuals share their stories related to HPV and HPV vaccination and health information is integrated into the stories (see Table 1).¹ In the video set there is an (1) introductory informational video, (2) six narrative videos designed for a target audience of U.S. women ages 18–26, and (3) three narrative videos designed for parents of children and adolescents.

The overall process for designing HPV Stories was guided by a cultural grounding approach, involving in-depth interviews with young adults and eliciting their vaccine decision stories, identifying prototypical stories, translating these stories into scripts, taking context, cultural cues and language use into consideration (Hecht & Krieger, 2006; Miller-Day & Hecht, 2013). Language used by young adults was solicited by undergraduate students. Thirty young women were interviewed to gather their HPV vaccine decision stories to understand: how they became aware of HPV vaccination, with whom they had conversations both in formal and informal settings, what messages they were told, and how they ascribed meaning to those vaccine messages. From the in-depth interviews, prototypical decision stories were identified (Hopfer, Garcia, et al., 2017; Hopfer, Ray, et al., 2017). These prototypical vaccine decision stories were then adapted into scripts for the intervention videos. A matrix of prototypical stories was developed, coupled with considerations to reach different geographic regions of the country, and identify various/multiple social identities into the script and film production (urban, suburban, rural; gender identities; peer or child-parent relationships; cultural cues including language use e.g., Spanglish, Boba, Catholic cues, Folklorico dance lesson, clothing and ethnicity of actors). Surface (vs deep) cultural cues (i.e., cultural contexts in which informal conversations about vaccination took place) were also integrated into scripts (e.g., women talking about OB/GYN visits in the car; semi-private locations; peer-peer or young adult child-parent conversations in the home/kitchen while cooking) (Resnicow et al., 1999).

¹The HPV Stories videos are owned and licensed by REAL Prevention LLC. www.realprevention.org. The videos were developed with funding from Merck & Co. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of Merck & Co or REAL Prevention.

Young adult graduate researchers who had conducted the interviews and were in the same age range and ethnicities as some of the target videos (Latina, Vietnamese) were asked to envision contexts in which they themselves informally discussed vaccination (outside of the medical setting). Scripts were then contextualized by situating conversations in realistic settings ranging from medical to informal semi-private settings, peer and child-parent conversations (e.g., kitchen at home, parked car, pool, ride home, having lunch/restaurant), as well as iconic settings for certain ethnicities (e.g., Little Saigon for Vietnamese American youth), and cultural cues (e.g., Latina parents talking at a Folklorico dance lesson for their daughters). The process resulted in the development of the 10 total videos: one informational video, six peer narrative videos, and three parent narrative videos. All videos were evaluated in the current study.

Participants and procedures

Participants were 992 students from a large Southwestern University and included 979 (98.7%) undergraduates and 13 (1.3%) graduate students. Participation was anonymous and voluntary. After receiving IRB approval from the institution, the surveys were distributed to students in health communication classes prior to watching the short films. The surveys were anonymous and by participating in the surveys, consent was implied. Following exposure to the videos, questions sought to evaluate how engaging the students perceived the video to be, how persuasive the video was, and any comments they had regarding the video. The students were then given 5–7 minutes between each video to fill out the questionnaire.

Instrumentation

A questionnaire was designed for this survey. Participants were asked to indicate their level of agreement on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). Given the purpose of this study, creating a questionnaire was an appropriate methodological choice as we sought to understand which videos were the most engaging and persuasive. These results allow for further application to HPV marketing and campaigns.

Quantitative

Engagement

Engagement was measured using four items, 'I enjoyed this video,' 'The video was boring,' 'The video was realistic,' and 'I think the video was NOT believable.' This measure came back reliable and obtained a Cronbach alpha reliability coefficient of .75 ($M = 3.53$, $SD = .78$).

Persuasiveness

Four items were included to measure persuasiveness, 'The video made me think about the importance of talking to a doctor about the HPV vaccine,' 'The video made me think about what might happen if I did not get the HPV vaccine,' 'The video made me think about the importance of getting the HPV vaccine,' and 'The video made me think about the importance of talking to other people about the HPV vaccine.' This measure was reliable and obtained a Cronbach alpha reliability coefficient of .86 ($M = 3.79$, $SD = .72$).

Qualitative

Qualitative data were also collected to enhance our understanding of the measures. Participants were able to write as much as they wanted regarding each video on the evaluation form. Qualitative data were then coded for statements referring to engagement, persuasion, and other. These data gave us a stronger understanding as to why the participants did or did not find the videos engaging or

persuasive. All written data not specifically refer to engagement or persuasiveness were categorized as ‘other’ and typically contained comments about specific messaging that they believed was important. For example, ‘They also addressed the stigma associated with the HPV vaccine,’ ‘Talked about cost, which is covered by insurance,’ and ‘Information covered cost of vaccine, insurance, importance.’

Results

The hypothesis forwarded suggested that there would be a positive association between engagement and persuasiveness. A two-tailed Pearson correlation revealed a significant relationship ($r = .52, p < .01$) and thus the hypothesis was supported.

The first research question sought to understand what HPV videos were the most engaging (see Table 2). A one-way analysis of variance (ANOVA) reached significance $F(9, 930) = 6.90, p < .001, (\eta^2 = .06)$, indicating that the videos were engaging. A closer examination of the means and the results of a Scheffe’s multiple comparison test revealed that three videos were rated as significantly more engaging than the others. Specifically, the Folklorico video ($M = 3.82_c, SD = .55$) was significantly the most engaging video, with the second most engaging being the Mother-Adult Daughter Conversation video ($M = 3.80_{bc}, SD = .71$), and the third being the Informational/Non-Narrative video ($M = 3.79_{bc}, SD = .54$). The second and third most engaging videos did not significantly differ.

A total of 15.52% of the participants provided qualitative comments providing additional insight into their engagement with the videos. Among the top engaging videos, participants commented mostly on acting, realism, interest, cultural elements and overall tone. Folklorico was the top-rated video in terms of engagement and participants shared that they were engaged because the ‘acting was good’ and the actors’ expressions funny. Comments revealed that respondents appreciated the ‘cultural integration in the video,’ respecting Latinx culture, including authentically Hispanic actors, and addressing ‘cultural barriers to vaccination.’ This approach was perceived as realistic, with one respondent stating, ‘I can imagine parents having this conversation.’ In addition to cultural integration and realism, the respondents commented that the information elements of the content were presented in an interesting, fluid fashion and ‘did not just throw information at you.’ Respondents perceived the overall tone of the video to be informative and funny and this is in contrast to the second most engaging video: Mother-Adult Daughter Conversation.

Respondents reported that they believed the mother and adult daughter ‘dynamic was relatable’ and personal in the Mother-Adult Daughter Conversation video. With the actors being interesting and the situation believable. The context of discussing ‘how a family member has been affected by HPV hit home.’ While the tone of this video was perceived as more serious, this was connected to being engaged in the narrative for some respondents. This video was also complimented for being culturally inclusive with the integration of Latinx actors. However, while one respondent cautions us to ‘be careful of stereotypes’ such as including background items such as a crucifix, another respondent applauds this feature as realistic.

Table 2. Analysis of variance – engagement.

Script	<i>M</i>	<i>SD</i>
1. Little Saigona	3.31	.88
2. Girlfriends in Carab	3.35	.74
3. Basketballabc	3.35	.88
4. Friends at the Poolabc	3.40	.67
5. Ruralabc	3.54	.79
6. Dinerabc	3.58	.78
7. Bobaabc	3.71	.78
8. Introductionbc	3.79	.54
9. Mother and Daughterbc	3.80	.71
10. Folkloricoc	3.82	.55

Lastly, the third most engaging video was not a narrative video at all, it was the informational video with women and men walking toward the camera and talking about HPV and vaccination. Again, respondents mentioned the diversity of the actors, youthfulness of the actors, and representation of ‘a diversity of voices.’ The tone was perceived as ‘informational,’ but respondents seemed to appreciate the conversational way in which the information was delivered. Most respondents were interested in the information stating, for example, they liked it because ‘it provided a lot of information in a short amount of time.’ Yet, one respondent indicated lack of interest in ‘just information’ arguing that if it is not personal ‘then I am not interested [in it].’ One thing that stood out in the qualitative data was that respondents provided comments on the production value of this video and did not really address this in the other videos that they found engaging. Many liked the music, editing, and energy of the video but still several others complained that there were ‘too many transitions’ that distracted them from the video and that the images of people walking quickly toward the camera while talking was confusing or ‘made me anxious.’ Respondents suggested that perhaps graphics could be inserted to emphasize key information such as statistics. Among the top three engaging videos, the informational video was the only one that elicited comments about production style. But thematic areas of feedback included comments about acting, interest in the content or situation, realism of the situation or actors, tone of the video, and cultural elements that contributed to engagement.

The second research question looked to understand what videos were the most persuasive (see Table 3). A one-way analysis of variance (ANOVA) indicated that they were persuasive reaching significance $F(9, 920) = 5.50, p < .001, (\eta^2 = .05)$. A closer examination of the means from Scheffe’s multiple comparison test revealed that one video emerged as the most persuasive (Mother and Daughter; $M = 4.15_{b}, SD = .57$). Notably, the second (Folklorico; $M = 3.93_{ab}, SD = .54$), third (Diner; $M = 3.90_{ab}, SD = .67$), fourth (Rural; $M = 3.89_{ab}, SD = .73$), fifth (Friends at the Pool; $M = 3.82_{ab}, SD = .64$), sixth (Introduction; $M = 3.81_{ab}, SD = .73$), seventh (Basketball; $M = 3.77_{ab}, SD = .83$), and eighth (Girlfriends in Car; $M = 3.75_{ab}, SD = .63$) video did not significantly differ in means. Boba and Little Saigon did not emerge as persuasive and the Little Saigon video emerged as the least engaging and persuasive video.

A total of 13.51% of the participants provided qualitative comments providing additional insight into their perceptions of video persuasiveness. The Mother-Adult Daughter conversation was ranked as the most persuasive video with respondents commenting on the attention, urgency, and perceived susceptibility to HPV. Respondents appreciated the realism of the narrative, it ‘caught my attention.’ It captured respondent’s attention because the video depicted ‘a real-life example’ and the ‘personal story is effective’ and also ‘compelling.’ The kind of ‘realistic conversation is relatable to family experiences.’ Although the video was ‘very serious and hard to watch. It was relatable if someone in family has/had cancer.’ This serious approach may have been persuasive because not only did it create a sense of urgency, but heightened perceptions of susceptibility. ‘[The video] reminds audiences that this can happen to anyone,’ in fact, as one respondent stated, ‘talking about stage 4 cervical cancer and surgery and its consequences puts fear into me and motivates me to get my HPV vaccination.’ Respondents also noted that the tag lines at the end of the video helped reinforce the messages in the video.

Table 3. Analysis of variance – persuasiveness.

Script	<i>M</i>	<i>SD</i>
1. Little Saigona	3.51	.83
2. Bobaa	3.68	.68
3. Girlfriends in Carab	3.75	.63
4. Basketballab	3.77	.83
5. Introductionb	3.81	.73
6. Friends at the Poolab	3.82	.64
7. Ruralab	3.89	.73
8. Dinerab	3.90	.67
9. Folkloricoab	3.93	.54
10. Mother and Daughterb	4.15	.57

Respondents perceived all of the videos with the exception of Boba and Little Saigon to be somewhat persuasive. Again, the feedback focused on catching their attention, establishing a sense of susceptibility to HPV, and a sense of urgency for vaccination. Interestingly, the feedback about Little Saigon – the least persuasive video – sheds some light on the statistical findings. While the mean score for persuasion was the lowest, it was not precipitously low. There were mixed qualitative reactions. For some respondents, this video had the most emphatic responses, for example, ‘I LOVED THIS ONE. We have Asian actors! Girlfriend educated boyfriend! I LOVED it’ and ‘Little Saigon hits home to me because I know where this [setting] is. . .it really did make think.’ Yet, the preponderance of comments focused on the importance of scripting narrative videos. While most acknowledged that the script was funny, it was generally not perceived as realistic and it did not capture the viewers’ attention. For example, respondents reported that the script was ‘too humorous,’ ‘[the] conversation seemed forced and unrealistic,’ and ‘the conversation with the couple was not very realistic but [the video can still] show importance of this vaccine for people in a relationship.’

Discussion

The goal of this study was to assess the effectiveness of existing HPV vaccination narratives in engaging and persuading college-aged adults. The prevalence of HPV-related cancers (CDC, 2021, 2023) and low vaccination rates in young adults is an ongoing issue (Dempsey et al., 2011), which emphasizes the need for new ways to persuade these individuals to vaccinate. Some scholarly attention has been given to interventions in primary care practices (Cates et al., 2018), identifying behaviors and barriers for young adults (Ragan et al., 2018), and interventions aimed at college women (Hopfer, 2012). Moreover, communication researchers found that narratives effectively disseminate health messages in a subtle and, therefore, more persuasive way (Green, 2006; Lee et al., 2011; Miller-Day & Hecht, 2013; Miller et al., 1998). However, less research has focused on assessing which types of narratives are the most engaging and persuasive. An individual’s engagement in a narrative is related to the persuasiveness (Miller-Day & Hecht, 2013; Miller-Day et al., 2015; Shin et al., 2018) and therefore, NET was used as a guide to identify which narratives were viewed as the most engaging and persuasive.

Results indicate that young adults were most engaged and persuaded by videos that incorporated a mother character. This finding aligns with the notion that young adults may continue to seek health-related information from their parents, especially in relation to vaccination (Hopfer, 2012; Hopfer, Garcia, et al., 2017). Furthermore, this finding suggests that young adults may be more likely to take into consideration the normative vaccine beliefs and attitudes of their parents when considering vaccination themselves.

In alignment with previous research on narratives and NET, the videos that participants perceived as the most realistic were also viewed as more engaging. This finding supports the notion that to be engaged in a narrative means that the individual views the story as authentic and relatable (Lee et al., 2011; Miller et al., 1998). Notably, the two videos that were rated as the most engaging involved a mother character. As explained by Miller et al. (1998), individuals’ engagement is also relevant to their perceived similarity or identification with the characters or the experiences within the story (Miller et al., 1998). Therefore, the Mother-Adult Daughter Conversation daughter video may be the most persuasive and both Folklorico and Mother-Adult Daughter Conversation videos were most engaging because mothers are more likely than fathers to have these conversations with their children, making the story more realistic.

Although college-aged individuals begin to become more self-reliant and independent in health-related decisions (DeLauer et al., 2020), some may continue to live with their parents, be covered under their insurance, or look to them for guidance regarding vaccination (Hopfer, 2012; Hopfer & Clippard, 2011; Reiter et al., 2009). Additionally, young adults do not always receive HPV-related information from their healthcare providers (Goff et al., 2011). Thus, parents’ vaccine attitudes and norms are taken into consideration when it comes to vaccination. In fact, young

adults may be less willing to vaccinate if their parent has not previously recommended that preventative action or does not approve (Ragan et al., 2018). The finding regarding videos that displayed peer HPV conversations were less engaging and persuasive suggests that these conversations are not occurring between friends, as much as with parents. In alignment with prior research (Houston et al., 2011; Larkey & Hecht, 2010), the Mother-Adult Daughter video may have been the most persuasive video because the audience identified with the young woman speaking with her mother in the narrative, either through perceived similarities of experiences or of people from their community. The use of parent-child conversations to persuade young adults to receive the HPV vaccine may be the most effective approach for interventions. Findings of this study offer both theoretical and practical implications.

Implications

Theoretically, the use and benefit of narratives in conveying health messages is supported in this study. Moreover, NET was supported by the findings of the study. Indeed, a narrative's strength is based on its ability to engage an audience (Miller-Day & Hecht, 2013), which this research specifically supports. Practically, it is important to know which narratives are most effective in engaging and persuading individuals to receive the HPV vaccine. Since intervention and prevention programs may use these particular videos in social media campaigns or in doctors' offices this practical implication is important in providing videos that will be the most effective.

Moreover, the qualitative findings support NET's emphasis on interest and realism and the appreciation of culturally diverse casting emphasizes identification with the narrative. It also adds to NET by noting the importance of establishing a sense of susceptibility and urgency in the narrative. These findings are also supported in other work on narrative with narrative interest and realism being linked to higher levels of perceived susceptibility or vulnerability in narrative health promotion (Hopfer & Clippard, 2011; McFarlane & Morgan, 2020; Nan et al., 2017). Given that previous research found low perceived susceptibility to be a barrier of vaccination (Vorpahl & Yang, 2018), the use of the most engaging videos from this study may help address that impediment. Since narratives can also promote healthy behaviors through modeling (Hinyard & Kreuter, 2007; Miller-Day & Hecht, 2013), the Mother-Adult Daughter video may also act as a reference for how young adult women can talk about HPV and vaccination with their own mothers. Lastly, the more engaged an individual is in a narrative, the more attentive they are to the message and the more likely they are to change (Miller-Day & Hecht, 2013). As such, the videos with mother conversations may be the most effective in the existing intervention and these types of stories may help inform future vaccine promotion efforts.

Limitations and directions for future research

As with all studies, the findings of the present study should be considered with the following limitations. First, the participants were not asked about their current relationship with their parents, which may help explain their engagement in the parental videos. Additionally, the participants did not have to indicate their prior knowledge of the HPV or the vaccine. An understanding of their prior health-related communicative experiences with their own parents would have enhanced the findings of this study.

Future research would benefit from conducting focus groups to further explore why the videos with parent-child HPV vaccination conversations emerged as the most engaging and persuasive. Focus groups would allow the researchers to ask more open-ended questions about the messages themselves, the tag lines, the storyline, setting, and other elements that made those particular videos more effective. Researchers should also seek to determine the most engaging aspects of those top videos. Focusing more on story elements would help to improve HPV messaging. Furthermore, it would be helpful to gain insight into participants' personal experiences talking about or hearing about HPV vaccine, such as where their health-related interactions typically take

place and with whom, as past experiences may help to inform how that influences their engagement and perceived realism of the videos. Additional qualitative data would allow for a deeper understanding of individuals' intentions to vaccinate or to talk with their peers, parents, or medical providers. Such conversations are imperative to understand when trying to effectively improve HPV vaccination in young adults.

Conclusion

In conclusion, this research supports prior NET research and identifies HPV videos that may persuade young adults to receive the HPV vaccine or discuss vaccination options with their health provider, parent, or peers. Higher rates of engagement, realism, and persuasiveness in the videos that involved a mother narrative provide insight into the type of narrative that is most effective in promoting vaccination in young adults. The findings of this study further demonstrate that the development of persuasive health narratives requires that the stories are engaging, emphasizing the importance of the different elements of engagement (i.e., interest, realism, identification). With an understanding of which videos were most engaging in this specific population, those narratives can help to inform new efforts to persuade college-aged adults to vaccinate. Further, identifying which videos were the most persuasive is an important step in further developing targeted HPV messaging and intervention.

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