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CULTURE-CENTRIC NARRATIVES AS HEALTH MESSAGE DESIGN STRATEGY:
DEVELOPING AN HPV VACCINE INTERVENTION FOR COLLEGE-AGED WOMEN

A Dissertation in

Communication Arts and Sciences

by

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ABSTRACT

Narrative forms of communication have been proposed as a promising tool for health behavior change. Since there are limits on the amount of information that can be conveyed in a given space or time, precision must be used in selecting the tools that most clearly and effectively convey necessary health information. This dissertation drew on culture-centric narrative theory (Larkey & Hecht, 2009) and exemplification theory (Zillmann, 1999) to inform the development of a human papillomavirus (HPV) vaccine promotion intervention. The dissertation consists of two studies. The first study identified determinants of HPV vaccine acceptability among college-aged women. The second study, a randomized clinical trial, tested the impact of narrative source on HPV vaccine decision-making and in a second set of analyses, tested mediators of narrative persuasion—identification with media characters, narrative transportation, perceived realism, and vividness.

Results of the first study identified assumptions underlying college women's decisions to accept and resist the HPV vaccine. Four assumptions underlying women's decision to accept the HPV vaccine included: the importance of supportive family messages, the importance of explicit health care provider endorsement of the HPV vaccine, descriptive peer norms normalizing HPV vaccination, and disease framing (i.e., cancer) shaping the benefits of HPV vaccination. Five assumptions underlying college women's decisions to resist the HPV vaccine included: skepticism of vaccine safety, the idea that alternative prevention strategies provide sufficient protection, stigmatizing messages related to HPV, overcoming self-efficacy barriers, and delay strategies. Common to all women's narratives was that relationship status framed women's perceptions of HPV susceptibility. The decision narratives shaped the content and focus of an

HPV vaccine video intervention that was developed to reach college-aged women. Results of the second study, a randomized clinical trial of the intervention, tested for the effects of narrative source on vaccination. Findings showed that after controlling for HPV knowledge, sexual activity, and daughter-parent vaccine communication, the combined peer-and-health care provider narrative intervention significantly increased HPV vaccine self-efficacy, intent and uptake. The second set of analyses, which tested narrative mediators, showed that identification with exemplars significantly mediated the relationship between peer narratives and HPV vaccine intent and that identification accounted for 71% of explained variance in a narrative communication model. Narrative transportation accounted for 56% of explained variance in the model, but showed effects only as a precursor of identification. Vividness, defined by the formal properties of video, accounted for 9% of explained variance in vaccine intent. Perceived realism did not significantly contribute to explaining how narrative source impacts HPV intent. Theoretical, methodological, and practical implications for advancing narrative message design for health promotion contexts as well as advancing HPV vaccine communication for practitioners are discussed.

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Chapter One

Introduction

Narrative communication has been proposed as a promising tool and literacy strategy for promoting health behavior change (2006; Hinyard & Kreuter, 2007; Kreuter et al., 2007; Larkey & Hecht, 2009; Moyer-Guse, 2008; Slater, 2002). Narratives, particularly those grounded in the target audiences' culture, are likely to resonate with audiences and therefore likely to engage them—an advantage not to be underestimated in health promotion where gaining attention to the message is a serious obstacle. Narratives, then, offer a potential communication strategy to address the persistent challenge in the design of health messages namely, the challenge to successfully engage, educate, and motivate audiences who are less involved, have low knowledge, and who are in early stages of readiness to adopt a behavior.

Statement of the Problem

How can narrative messages be designed to effectively reach audiences and promote health behavior change? Moreover, how do narrative communication forms demonstrate effectiveness? Answering these questions lies at the heart of the goals of this dissertation. Furthermore, this dissertation builds on a line of research that investigates what it is about narrative modes of expression that so many find appealing, delineates the contexts for which narrative communication strategies prove advantageous over other communication forms, and identifies most importantly, how the use of narratives can advance public health communication theory.

Overview of the Dissertation

The present study applies narrative strategies to the context of human papillomavirus (HPV) vaccine decision-making. The Centers for Disease Control and Prevention have called on public health scholars to identify effective communication strategies for the HPV vaccine to reduce the transmission of HPV, a common sexually transmitted disease known to cause cervical cancer (CDC, 2002).

Narratives are both a mode of expression and a method of inquiry for uncovering implicit values underlying attitudes. With this in mind, narratives were first applied in the present study as methodology to uncover the implicit assumptions underlying HPV vaccine attitudes among college women. The resulting narratives shaped the scripts used for developing a video intervention promoting HPV vaccination. A culture-centric narrative approach guided this formative research. A culture-centric narrative framework emphasizes the importance of designing messages by enlisting the views of those an intervention is intended to reach (Larkey & Hecht, 2009). Formative research findings raised the question of whether vaccine messages would be received more favorably from peers or medical experts. As a result, narrative source became the communication variable of interest in testing a subsequent intervention aimed at promoting HPV vaccination in college women.

The effects of peer, expert, and combined peer-expert appeals were examined for their effect on HPV vaccine intent and uptake, and tested for their contribution as predictors of exemplification effects. Exemplification theory (Zillmann, 1999, 2002), which guided the second study, is premised in the idea that audiences can be influenced in desired directions by deliberate exposure to a sampling of personal narratives (i.e., prototypical exemplars of people's personal

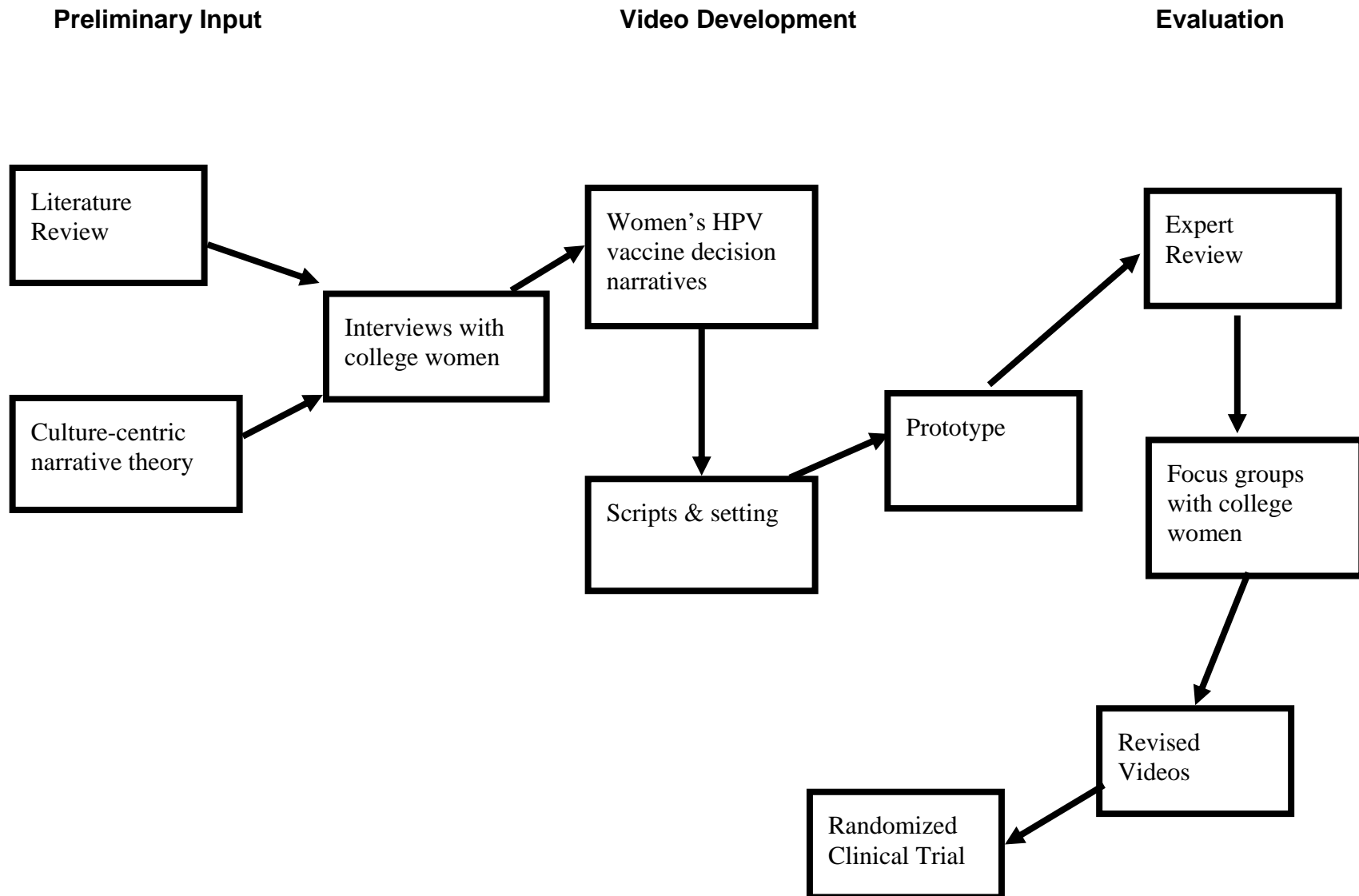
experiences with an issue) and that these personal narratives or exemplars operate as a mode of explanation that is distinct from statistical appeals. Source effects are widely documented in the social influence literature (Giles & Street, 1985; Kelman & Hovland, 1974) so this may be a powerful addition to exemplification theory. Thus research questions centered around whether narrative communication forms were more persuasive than didactic forms and which narrative source type predicted more effective narratives. Additional analyses examined the relative contributions of four narrative mediators: narrative transportation, identification with media characters, vividness, and perceived realism. An integrated model of narrative communication for health promotion guided the testing of these mediators.

Overall, therefore, the goal of the dissertation was threefold—namely to: (1) conduct formative research that identifies determinants of HPV vaccine acceptability among college-aged women, (2) conduct a randomized controlled trial to test the efficacy of a narrative intervention promoting HPV vaccination, and (3) test mediators of narrative processing.

The dissertation research incorporated a multi-method design starting with qualitative formative research, which set out to identify the assumptions underlying college women's HPV vaccine decisions, and then followed by a quantitative experimental design testing the efficacy of a narrative-based video intervention promoting HPV vaccination. The intervention development process was carried out in an iterative fashion building on findings at each step (see Figure 1.1). Thus, the intervention was both theory derived and grounded in formative research given that the field of HPV vaccine communication is a relatively new domain (the vaccine was first approved for public use in June 2006).

Figure 1.1

INTERVENTION DEVELOPMENT PROCESS



The Health Context

HPV vaccination was the health context for this study. HPV is the most common sexually transmitted infection in the United States and is linked to the development of cervical cancer, other cancer types (e.g., head and neck, anal) and an increased risk for premature birth (Sjoberg & Eskild, 2009; Walboomers et al., 1999). The HPV vaccine's high response-efficacy in preventing the four most common HPV types positions communication at center stage since effective communication determines whether the volitional HPV vaccine will be adopted (thereby translating the vaccine's potential into reduced HPV morbidity). As a result, the translational impact of the study carries both practical and theoretical implications. Practically, an effective communication intervention can inform health practitioners and translate into increased HPV vaccination rates that reduce morbidity related to HPV. Theoretically, the studies conducted in this dissertation developed a culturally grounded intervention that maximized participants' identification with the content, extended exemplification theory by advancing knowledge about narrative source, and applied an integrated narrative communication model to examine the relative contributions of four narrative mediators in understanding why narrative communications impart suasive effects.

HPV and its Link to Cervical Cancer

HPV is a necessary precursor to cervical cancer (Walboomers et al., 1999). Cervical cancer remains the second most common cancer in women worldwide accounting for 500,000 new diagnoses each year (Parkin, Bray, Ferlay, & Pisani, 2005). In the United States an estimated annual 10,370 new cervical cancer diagnoses occur each year along with an estimated 4000 annual deaths (Dunne et al., 2007). Even in industrialized countries that offer Pap screening, young women continue to die from cervical cancer as exemplified in the case of 27-

year-old British media personality, Jade Goody, who died on March 22, 2009. HPV vaccination can prevent cervical cancer constituting a new prevention paradigm in the domain of cervical cancer prevention.

For the first time in medical history there is a vaccine that has the potential to significantly reduce the incidence of cervical cancer (Franco et al., 2006; Wright et al., 2006). The HPV vaccine (Gardasil®), approved and released by the U.S. Food and Drug Administration (FDA) in June 2006, shows promise in reducing cervical cancer incidence up to 70% by eradicating two high-risk HPV types (16, 18). Having a vaccine that prevents certain cancers is a tremendous scientific advancement. However, unless a vaccine is put into practice it remains merely a laboratory achievement. Effective communication is needed to translate scientific advances into decreased HPV-related morbidity and mortality. Given that cervical cancer is a preventable disease and that vaccination has the potential to prevent 70% of cervical cancers, communicative success is imperative.

*Communication as the Nexus of Translating the Benefits
of the HPV Vaccine into Improved Health*

Currently, there is no established strategy for communicating about the HPV vaccine (Sherris et al., 2006). Studies show that information about HPV vaccination is confusing (Brandt, McCree, Lindley, Sharpe, & Hutto, 2005; Wetzel et al., 2007). Furthermore, a complex array of psychosocial factors presents challenges to communication promoting HPV vaccination (Brewer & Fazekas, 2007; Crosby, Schoenberg, & Hopenhayn, 2007; Zimet, Liddon, Rosenthal, Lazcano-Ponce, & Allen, 2006). These communication challenges range from barriers common to many health behaviors such as low perceived personal vulnerability (Allen et al., 2008; Gerend & Magloire, 2007) to barriers unique to HPV vaccination such as fear of long-term

unforeseen adverse health outcomes (Zimet et al., 2006). A lack of confidence in federal regulatory oversight ensuring the safety of vaccines has resulted in public mistrust of vaccines and their corresponding campaigns (Davis et al., 2006). Other communication challenges inherent to HPV vaccination include the social stigma associated with HPV—both because it is a sexually transmittable infection and because of the belief that HPV vaccination will lead to increased promiscuity (Kahn et al., 2007). Finally, widespread low and inaccurate HPV knowledge complicates message design, raising questions about whether communication style or evidence form is as important as content (Allen et al., 2008; Gerend & Magloire, 2007).

Although women may have heard of HPV due to the flurry of media campaigns, the accuracy and depth of their HPV knowledge remains limited (Ache & Wallace, 2008). Overcoming these challenges will be critical to realizing the HPV vaccine's potential (Anhang, Goodman, & Goldie, 2004; Sherris et al., 2006). Finally, demographic factors such as age must be considered. In particular, messages targeting females aged 18–26 are needed since the advisory committee on immunization practices (ACIP) recommends catch-up HPV vaccination for this age group (Markowitz et al., 2007; Zimet, Kahn, & Shew, 2008). Furthermore, messages targeting females aged 18–26 differ considerably from messages targeting 9- to 12-year olds.

The Case for Reaching College-aged Women

College-aged women are at particularly high risk for HPV acquisition (Dunne et al., 2007). Epidemiological studies have shown a four-fold increase in HPV acquisition between the first and fourth year of college. Overall, 74% of HPV acquisition occurs between ages 16–26, a range that includes the college years (Markowitz et al., 2007). The transition to university for young adults is often a time period of initiation, continuation or escalation of sexual activity (Arnett, 1996). Judgments in decision-making related to protective sexual health behaviors are

often poor as evidenced by limited STI knowledge, frequent condom failures, and/or failure to use STI protection (Crosby et al., 2007; Downs, Bruine de Bruin, Murray, & Fischhoff, 2006; Rouner & Lindsey, 2006).

College-aged women stand to benefit from HPV vaccination. Although there are no precise estimates of the number of women most likely to benefit from the HPV vaccine, available estimates indicate that 30% of women entering college are not yet sexually active: as protection against initiation of activity, the HPV vaccine is likely to be maximally effective (Dunne et al., 2007). In addition, 42% of women entering college who are sexually active are estimated to be HPV-free (Dunne et al., 2007). Combining these groups (those not yet sexually active with those sexually active and estimated to be HPV-free), 72% of women entering college (at PSU, 72% = 12,000 undergraduate women) stand to fully benefit from the HPV vaccine (i.e., receive protection against all 4 HPV types).

Despite their vulnerability, most college women have not been vaccinated for HPV¹. Ultimately, given that the vaccine, while widely available, is volitional and may be costly, college women's vaccination attitudes will determine whether they adopt the vaccine. These attitudes and beliefs are largely unknown, with public health efforts thus far having concentrated primarily on understanding the attitudes of parents to ensure that 11- to 12-year olds vaccinate (Constantine & Jerman, 2007; Kahn, 2007; Zimet et al., 2008). The research described here sought to fill this gap in the HPV vaccine literature by focusing on designing vaccine messages specifically targeted to college-aged women.

HPV Vaccine Acceptability among College Women

¹ PSU UHS 2008 data showed 36% of undergraduate females were vaccinated in a random sample indicating a remaining 64% in need of being reached (LaSalle, 2008).

Vaccine acceptability is necessary to promote uptake of the HPV vaccine. Acceptability is defined as vaccine attitudes and beliefs that predict vaccination adoption (Brewer & Fazekas, 2007). Previous research on vaccine acceptability has shown that potential factors related to HPV vaccine acceptability include: (a) being sexually active, (b) having ever been diagnosed with a sexually transmitted disease or having an abnormal Pap test result, (c) health care provider vaccine recommendation attitude, and (d) daughter-parent vaccine communication (Crosby et al., 2007; Friedman & Sheppard, 2007; Kahn, 2007; Kahn et al., 2007; McCree, Sharpe, Brandt, & Robertson, 2006; Zimet et al., 2000). These same studies identified a number of potential barriers to HPV vaccine acceptance including: (a) cost (\$160 per shot x 3 shots), (b) low perceived susceptibility for HPV, and (c) apprehension regarding vaccine safety. Much of the existing research was primarily conducted on parents and their 9- to 12 year old daughters. As a result, the research appears to be missing important opportunities for how to effectively reach college-aged women. A review of factors that have played a role in other vaccine campaigns provides the opportunity to learn lessons from previous and somewhat similar contexts.

Lessons Learned From Previous Vaccine Campaigns

A review of prior vaccine campaigns (influenza, hepatitis) reveals similarities as well as differences between previous vaccine campaigns about other infectious diseases and HPV vaccination. Across diseases there appear to be similarities in public mistrust of vaccination (Davis et al., 2006), the importance of increased specific over general vaccine knowledge for behavior change (McDivitt, 1997), low perceived personal vulnerability (Brewer et al., 2007), and the influence of social networks (e.g., whether friends have received the vaccine) on vaccine decision-making (Telford & Rogers, 2003). Differences between prior vaccine and HPV vaccine promotion efforts include (a) the potential stigma associated with the HPV vaccine—that it may

lead to sexual promiscuity (Kahn et al., 2007) and (b) the absence of pre-existing attitudes about the HPV vaccine since it is relatively new for public use (Zimet et al., 2008).

Lessons learned from these previous vaccine campaigns include recognizing the influence of social networks on vaccine attitudes indicating the importance of investigating social norms in vaccination decisions (Telford & Rogers, 2003) to anticipating resistance in a subset of the intended audience (Brewer et al., 2007; Downs, Bruine de Bruin, & Fischhoff, 2008). Many of these lessons point to vaccine acceptance residing in cultural considerations. As a result, didactic messages are less likely to be maximally effective. Instead, a novel message design methodology (i.e., a culturally grounded approach) is needed to capture cultural and social perspectives framing HPV vaccine decision-making among college-aged women. A culturally-grounded approach was used in the first study of this dissertation to document the cultural and social perspectives framing HPV vaccine attitudes and decision of college women.

Preview of Upcoming Chapters

In summary, HPV vaccination is a promising public health strategy that has yet to realize its potential due to challenges communicating effective messages promoting uptake. Previous research has identified a number of factors to consider in vaccine promotion campaigns and both exemplification theory and culture-centric narrative theory were identified as useful frameworks for guiding this process. The next chapter (chapter two) provides a literature review of theoretical orientations on the use of narratives in health promotion that inform the two studies that follow. Chapter three reports on study one, which describes the meanings college women ascribe to HPV vaccine messages they receive from family, peer, and health care providers. Chapter four reports on the results of a randomized clinical trial (RCT) designed to test the impact of a narrative-based video intervention on HPV vaccine uptake. Chapter five reports on a

second analysis of the RCT, testing causal mechanisms of narrative processing. Chapter six, the conclusion chapter, contains a discussion of the theoretical and practical implications of this research for designing HPV prevention campaigns.

Chapter Two

Literature Review

The use of storytelling to influence behavior is at least as old as Aesop and is deeply ingrained in Western as well as non-Western cultures (Slater, 2002).

Communication scholars increasingly invoke narrative in their theory resulting in an explosion in research about narrative communication and its potential as a persuasion and literacy strategy for health behavior contexts (Cappella & Hornik, 2009; Green, 2006; Hecht & Miller-Day, 2009; Kreuter et al., 2007; Larkey & Hecht, 2009; Miller-Day, 2008b; Moyer-Guse, 2008). These recent understandings of narrative have led to a more nuanced view of narrative forms.

Defining Narrative

What is narrative then? The term carries many meanings and is used for a variety of purposes. Narrative communication forms distinguish themselves from other communication by “promoting a kind of cognitive traction: a densely textured surface on which members of the public can engage their prior experiences, feelings, and attitudes” (Petraglia, 2009, p. 180). Narrative form thus offers a rich format for persuasive means and for generating dialogue.

A historical, disciplinary perspective on narrative provides contrast and thereby brings into focus the contours of meaning found in narrative. In psychology, narrative often is interpreted from a developmental perspective in which narratives are understood and interpreted as expressions of identity (Mackey, Arnold, & Pratt, 2001; McLean,

2005; Sevon, 2005). Important to this line of work is the claim that narratives in individual and social contexts are central to the development of the self-concept (McAdams, 1993). For example, narratives have been employed to gain richer insight into transitional life stage changes such as late adolescent identity development (McLean, 2005) and narrating the choice to become a mother (Sevon, 2005). By contrast, anthropological perspectives of narrative tend to privilege the cultural, socially constructed, normative understandings of social phenomenon and how groups use narratives to mobilize others and to gain a sense of belonging (Fitch, 2003; Gregg, 2003; Lee & Leets, 2002; Rhodes & Cusick, 2002). For instance, hate groups have begun to use narratives to influence others and to promote their vision (Lee & Leets, 2002). In contrast to societal, cultural understandings of narrative, a discourse perspective narrows the scope of narrative to its literary, archetype structure, whose story elements can be re-arranged to elicit more or less suspense and curiosity as example (Knobloch-Westerwick & Keplinger, 2007).

Finally, a communication perspective on narrative, as is applied in this dissertation, situates narrative in the day-to-day “talk” that comprises and constructs meaning from both interactions with others in communicative exchanges and from internal, ‘mental’ dialogue. In communication theory, Fisher (1985) interprets narration as a human communication paradigm. That is, narrative is central to human experience and a key way that experience is made meaningful. According to Fisher, human communication should be viewed as historical and situational, as stories competing with other stories constituted by good reasons, and as being rational when they satisfy demands of narrative probability and fidelity.

“Neither the facts nor our experience comes to us in discrete and disconnected packets which simply await the appropriate moral principle to be applied. Rather, they stand in need of some narrative which can bind the facts of our experience together in a coherent pattern and it is thus, in virtue of that narrative that our abstracted rules, principles, and notions gain their full intelligibility.” Fisher, 1985, p. 3

Thus, a communication lens on narrative integrates the other perspectives mentioned but applies them to *messages*, with a focus on interpreting the meaning of messages rather than other variables such as identity or archetypes. The communication lens focuses on narratives and how they operate in the lives of people rather than focusing on the groups or individuals that communicate them. The present dissertation applies a communication lens to narrative with the idea that examination of the messages as they are understood within storied decision accounts provide valuable insight into the underlying assumptions that people hold about a phenomenon of interest (e.g., HPV vaccination). Distinguished from other forms of discourse, narrative talk is defined by sequence and consequence—events that are ascribed meaning and are selected, organized, connected, and evaluated as meaningful for a particular audience. Narrative is therefore used as a deliberate vehicle to both understand and promote health behavior change in audiences.

Narrative Message Design

Regardless of how narrative is defined, few theories provide explicit guidance on how to design narratives. Most narrative theories focus on explaining narrative effects rather than how to design the narratives. In other words, most narrative theories are audience-centered, focused on explaining audience responses to narratives. Two narrative

theories however provide frameworks for the process of designing narratives for health promotion: culture-centric narrative theory for health promotion (Larkey & Hecht, 2009) and exemplification theory (Zillmann, 1999). I review these next.

Culture-Centric Narrative Theory for Health Promotion

The culture-centric narrative theory of health promotion argues that in order to effectively reach an audience, narrative messages must incorporate a targeted group's detailed and specific understanding of the health issue at hand as a first step toward designing authentic narratives (Larkey & Hecht, 2009). Authenticity is privileged in culture-centric theories of health promotion (Guttman, Gesser-Edelsburg, & Israelashvili, 2008; Petraglia, 2009). Narratives offer the best strategy for producing authentic health messages because their form is amenable to reflecting the narrator's perspective more so than other communication forms.

A fundamental principle to designing authentic messages involves enlisting the views of the intended audience. The participation of an intended audience for a health intervention can be accomplished in a number of ways, foremost among these is to collect actual narratives from the target group and use them either as the message, themselves, or in re-enactments and other fictionalized forms (Hecht & Krieger, 2006; Hecht & Miller-Day, 2009). Influence attempts are thus approached by integrating culture-specific ideas rather than at the message level strategy.

For instance, in Columbian culture, connections between people vary along dimensions of *confianza* (closeness, trust) created by status and other kinds of difference (Fitch, 2003). The degree of *confianza* thus, is the basis for evaluating a wide range of behavior. The point of this illustration is that guidance for narrative messages relies on

identifying and tapping into implicit cultural values (grounded in history and enacted in social contexts) and rendering these values explicit in the narratives used for health promotion. Therefore, it is important to identify the cultural codes that invoke personal meanings and employ these to effectively reach an audience. If narratives are perceived as authentic, the audience will be more likely to listen.

The strengths of culture-centric narrative theory lie in its approach that privileges the audience perspective. “Proof” or argument to adhere to a recommended health behavior is culturally derived. Culturally derived proof draws on reasons justifying behavior change that are grounded in the dominant stories of the intended culture. The approach has worked in successfully reaching populations where other efforts have failed.

Culture-Centric Narratives and Health Messages. Narrative approaches guided by a culture-centric framework have resulted in positive health behavior change across a number of health contexts. These include increasing cervical cancer screening in women living in rural areas (Evans, Edmundson-Drane, Harris, & Campbell-Ray, 2002; Richardson, Owen-Smith, & Howe, 2002), increasing colon cancer screening among a Latino population (Larkey & Gonzalez, 2007), advocating condom use to decrease AIDS (Brinson & Brown, 1997; Kiene & Barta, 2003), decreasing at-risk youth’s alcohol and marijuana use (Nelson & Arthur, 2003), preventing prior opiate addicts from relapsing (Jodlowski, Sharf, Nguyen, Haidet, & Woodard, 2007), and increasing middle school adolescents’ skills to resist drug offers (Hecht & Miller-Day, 2009). As Fitch (2003) notes, these communication strategies are grounded in and reside at the cultural-specifics level.

A drawback to culture-centric narrative approaches is that extensive formative research is required that is time consuming, costly, and labor intensive. These involved approaches are not as feasible for many public health educators. I turn next to the second narrative-based theory that provides guidance on how to design narratives for health promotion.

Exemplification Theory

Exemplification theory (Zillmann, 1999) conceptualizes narrative as a sampling of prototypical exemplars or testimonials (i.e., a snapshot of multiple viewpoints and perspectives) rather than one comprehensive story structure. These exemplars are then presented jointly with statistical messages providing different evidence types to persuade the audience. Exemplars can take the form of photos or footage of individuals affected by an event or issue, quotes from those interviewed for a story, anecdotes recounted by a reporter, or firsthand testimonials. Exemplars are commonly used in journalistic practice to bring a human element or personal angle to the story to provide vividness or color and ultimately to attract attention to the story. Whichever form, exemplification treats narrative as examples offered in support of a thesis (e.g., advocating a desired health behavior change). Narratives can then be altered by their valence in support of or counter to the statistical messages.

Exemplification and Health Messages. In exemplification theory, Zillmann recognizes the persuasiveness of examples (i.e., exemplars) to communicate the magnitude of perceived health risks (Zillmann, 2006). Furthermore, Zillmann recognized that exemplars employed strategically can reach less-involved audiences about health issues.

Earlier exemplification research focused on understanding how people draw inferences from a sampling of exemplars to assess magnitudes of risk (e.g., exemplars were varied by the number of exemplars representing minority and majority views) (Cantor, Alfonso, & Zillmann, 1976; Gan, Hill, Pschernig, & Zillmann, 1996; Gibson & Zillmann, 1994; Zillmann, 1999, 2006; Zillmann, Gibson, Sundar, & Perkins, 1996). These studies largely showed that even when exemplars contradicted statistical appeals (exemplified exceptions), that the exemplar views dictated people's perceptions of issues.

Later studies varied exemplars to elicit greater emotional response (Aust & Zillmann, 1996; Brown & Walsh-Childers, 2002; Sundar, 2003; Zillmann, 1994, 2002; Zillmann & Knobloch, 2001). A series of exemplification studies varied the vividness of exemplars to elicit greater emotional responses and predicted that more vivid exemplars would have greater effects on perceptions of an estimated health risk. Vividness was operationalized in a number of ways ranging from the effect of quoted versus paraphrased testimony (Gibson & Zillmann, 1993, 1998), the use of dramatic, emotional versus calm voices (in radio delivered exemplars) (Aust & Zillmann, 1996) to threatening visual images of disease versus sanitized visuals (Zillmann & Gan, 1996).

The findings from exemplification theory are clear and consistent. Audiences rely on and recall exemplars rather than the base rate statistical information when making judgments about social phenomenon. These exemplification effects have been demonstrated in print and electronic news stories. In order for exemplification theory to be useful for public health promotion, exemplification effects need to be demonstrated in health behavior change contexts (i.e., that the inclusion of exemplars in health messages can move audiences to adopt advocated behaviors).

Merging the Ideas of Culture-Centric Narrative and Exemplification Theory

These two theories guided narrative message design in the present study. The former theory gave rise to the notion that the messages for an HPV vaccine intervention reflect the intended audience's views—that narratives elicited from college women should be used for an HPV vaccine intervention aimed at college women. Exemplification theory gave rise to the idea first, of employing *multiple* short exemplars of experiences and viewpoints, and second, to employ these exemplars with a heightened consciousness as to the valence or viewpoint of the story the exemplars reflect in relation to statistics about HPV that are included in the message. Exemplification gave rise to a designing a narrative intervention in the present study that included a mix of viewpoints about HPV vaccination to promote a balanced perspective that appears less overtly persuasive. Both exemplification and culture-centric narrative theory emphasize the importance of employing prototypical narratives promoting the audience perspective on a health issue. I turn next to a discussion of what narratives do—that is, in what ways theorists discuss how narrative communication can advance public health promotion.

Areas of Promise for Employing Narrative Communication in Health Promotion

Narrative approaches to message design have demonstrated effectiveness for certain contexts and purposes. A synthesis of the extant literature delineates at least four purposes or contexts for which narratives prove advantageous as influence attempt. These include (a) rendering complex information comprehensible (Kreuter et al., 2007; Pennington & Hastie, 1992), (b) reaching resistance audiences (Green & Brock, 2000; Moyer-Guse, 2008; Slater & Rouner, 2002), (c) engaging less involved audiences (Zillmann, 2006), and (d) rendering culturally relevant health messages (Hecht & Miller-

Day, 2009; Larkey & Hecht, 2009). These four areas are reviewed next for how they show promise to advance public health theory.

Narrative Forms Render Complex Information Comprehensible

Narrative communication forms can serve as organizational framework that provide reference points to facilitate decision-making. This has been demonstrated in judicial contexts in which evidence presented in story form facilitated sense-making of complex scenarios explaining behavior (Pennington & Hastie, 1992). Pennington and Hastie (1992) posited in their Story Theory that story form evidence persuades audiences to a greater degree than non-story forms of evidence.

In judicial contexts, when jurors are presented with complex information and they must deliberate a verdict about the actions of an individual, having evidence presented in story form serves as organizing principle for judging that behavior. Pennington and Hastie (1986, 1993) showed that jurors both better comprehended evidence presented in stories *and* made sense of evidence by justifying verdicts with “storied” accounts of what happened (i.e., they imposed narrative structures to make sense of events). Those stories perceived as most plausible were most persuasive. Story form brought a sense-making quality to complex and otherwise, isolated evidence that aided rationales for decision-making.

Studies showed that story form also impacted information utilization patterns for decision-making. When presented with evidence in story form, jurors drew more on motivational than factual information to deliberate a verdict (Pennington & Hastie, 1992). This idea, although not yet tested in health contexts, has been proposed as showing

promise for helping patients making complex cancer treatment decisions (Kreuter et al., 2007).

The unique advantage of narrative communication for decision contexts is that it provides both the motivational and emotional connections that render information more meaningful as it relates to a pending decision and serves to organize information frames into meaningful segments. Thus, Pennington and Hastie suggest in their Story Theory that humans may in fact impose narrative structures to make sense of complex information. Narrative forms are appealing not only because they organize information into meaningful frameworks, but also because their form is less overtly persuasive. Narrative communication forms might also have advantages in reaching resistance audiences.

Reaching Resistance Audiences

Edutainment-education theorists have argued that narrative communication forms may be more able to reach resistance audiences (Green, 2006; Kreuter et al., 2007; Moyer-Guse, 2008; Slater & Rouner, 2002). Resistance to behaviors is defined broadly as reaction against change or the motivation to oppose persuasive appeals (e.g., resistance to screening recommendations). The ways in which persons resist behavior is reflected in the ways they resist messages. These may include denying the effectiveness of a behavior, refusing to adopt an advocated behavior, counterarguing message claims, ignoring messages altogether, or denying the validity of a message due to source. Edutainment theorists have argued that narratives may reach resistant audiences more effectively for two reasons: psychological immersion into a story, which results in

reduced counterarguing and the implicit nature in which narratives communicate messages.

Individuals may become psychologically immersed when they read or view stories. Psychological immersion, also termed narrative transportation, is proposed to be effortless and a distinct mental process that is different than cognitive elaboration. When transported there is no desire to disrupt the narrative flow and enjoyment of the story, and therefore, there is less counterarguing (Green & Brock, 2000; Green, Garst, Brock, & Chung, 2006; Green et al., 2009; Slater, Rouner, & Long, 2006).

A second explanation for why narrative communication forms may be particularly apt at overcoming audience resistance is the *implicit* nature in which narratives convey their message. In entertainment-education, the health message is secondary and embedded within an overarching story aimed foremost at entertaining. Entertainment is the pretext for gaining the attention of audience. This can be likened to a foot-in-the-door strategy in which entertainment is employed to gain buy-in with an audience that might otherwise not listen. Then, with a captivated audience, implicit messages about desired health behaviors are incorporated into the story plot as an influence attempt (Green, 2006; Moyer-Guse, 2008; Slater, 2002).

Narrative forms with implied health messages show promise for tackling more challenging health behavior goals such as changing social norms about taboo topics related to sexual health (e.g., increasing use of condoms) or preventive screening (Smith, Downs, & Witte, 2007). Entertainment-education frameworks can therefore function as a literacy strategy to overcome social barriers. Compared to overt persuasive health messages, entertainment pretexts stand a better chance of gaining the attention of

populations such as adolescents who may be less inclined to listen unless presented with an entertaining story. Overlapping with the idea of entertainment-education is the use of exemplars or testimonials to present a more vivid, lively, and personal angle to news stories. Exemplification theory presents the idea of employing narratives to capture the attention of less involved audiences.

Narratives More Effectively Reach Less Involved Audiences

Employing a sampling of testimonials reflecting personal experiences in addition to statistical messages can both enhance the relevance of and bring attention to an issue that might otherwise not receive much attention. Exemplification research (Zillmann, 1999, 2002) has shown consistently that the inclusion of exemplars exerts influence on audience perception of issues. Reaching audiences effectively has been tackled not only for understanding that audiences may process messages using heuristics when they are less engaged but that the content of narratives must have cultural relevance for an audience if narratives are to successfully draw in an audience. Thus, a fourth reason why and when narratives prove useful as communication strategy is when they reflect culturally relevant context for specific audiences.

Rendering Health Messages Culturally Relevant

Bombarding audiences with didactic messages (e.g., you should stop smoking, you should change your diet) has proven ineffective in changing health behaviors (Adelswärd & Sachs, 1996). A culture centric narrative framework (Larkey & Hecht, 2009) extends rationales for behavior change by tapping into cultural identities and drawing on rationales derived from the cultural group that a prevention intervention is intended to reach. This approach has led to narratives being perceived as more authentic

(Guttman et al., 2008; Petraglia, 2009) and thereby, exerting influence. Thus, narrative approaches and in turn, narrative messages can be useful when attempting to design an intervention aimed either at a non-mainstream population or adolescent populations where other approaches have failed and where effectively reaching an audience calls for tapping into cultural perspectives of understanding both the health issue at hand and the way in which the target audiences understands the health issue.

To summarize, the extant literature delineated four purposes or contexts for why prevention researchers and communication scholars designing health interventions would want to consider employing narrative communication forms. First, for decision contexts involving complex information, narrative forms can provide an organizational framework that brings a sense-making quality to decision-making. A second advantage for employing narrative communication forms includes reaching resistance audiences. Narrative forms' implicit way of advocating messages appears to elicit less reactance. Third, narratives, which are inherently more engaging and emotionally interesting than didactic messages can be a tool to reach less involved audiences. Finally, tapping into cultural understanding of how an audience thinks about a health issue and explicitly mirroring this in narratives renders health messages more authentic to audiences.

The next and final literature review section reviews the extant literature on narrative theories' explanations for *how* narratives impact health attitudes and behavior.

Explanations for How Narratives Exert Influence: Mediators

Understanding why narratives appear so appealing to audiences is important to advancing narrative theory. As Moyer-Guse (2008) points out “despite empirical advances in this area, more work is needed to understand fully what makes narrative

health communication unique from a message processing standpoint.” Four explanations for narrative effectiveness have been advanced in the communication literature: narrative transportation, identification with media characters, vividness, and realism. The present research attempts to shed light on the relative contributions of these four mechanisms.

Narrative Transportation

Transportation is the act of becoming psychologically immersed into the [viewing] activity of a narrative (Green & Brock, 2000). The notion of narrative transportation has been equated with “being carried away or lost in a story.”

Transportation has been applied not only to understanding narrative effects of written stories, but also when listening to radio stories, watching television, or even short film interventions (Green et al., 2009).

Narrative transportation has been given several different labels in the literature including narrative engagement, absorption, immersion, and involvement. Green (2009) claims that engagement and absorption are more general concepts while transportation is an experiential response. The main idea consists of being engaged in the storyline rather than in one’s immediate environment and experiencing vicarious emotional and cognitive responses to the narrative. The strength of a narrative, thus, lies in its ability to create an emotional experience that can engage, move, stimulate, provoke, and consequently, produce desired changes. Put another way, transportation is defined as a convergent process where all mental systems and capacities become focused on events occurring in the narrative (Green & Brock, 2000).

Green and Slater have each argued that narrative transportation is understood as a distinct mental process that feels effortless and enjoyable (Green & Brock, 2000; Slater &

Rouner, 2002). The greater the level of transportation (i.e., engagement) the more likely audiences are influenced by the messages implied by a narrative. In other words, the lessons of a narrative may “hit home harder” when transported.

Green has argued that when audiences are transported that their desire to disrupt the narrative flow decreases and as a result, they are less inclined to counterargue the message implied by the narrative (Green, 2004; Moyer-Guse, 2008; Slater & Rouner, 2002). In this manner, narrative communication forms appear to be a more effective approach to reach resistant audiences.

While media scholars’ interest in narratives resides in understanding how transportation affects media enjoyment, health communication scholars’ interests reside in understanding how narrative transportation can lead to adoption of advocated health behaviors (Green et al., 2006; Hinyard & Kreuter, 2007). That is, for public health communication contexts, a critical interest is in showing whether transportation effects can impact health outcomes. Second, a review of extant literature indicates that transportation shows promise in explaining narrative effects given that it has explained effects in multiple delivery formats: laboratory media settings, reading stories, and theatre performances (Braverman, 2008; Green & Brock, 2000; Green et al., 2009; Larkey & Gonzalez, 2007; Miller, Hecht, & Stiff, 1998; Murphy, 2009; Slater et al., 2006). These findings lend credence to including transportation as a key mechanism explaining narrative effectiveness. The mechanisms that explain how narratives persuade remain unknown (Larkey et al., 2008). Equally important to understanding narrative effectiveness includes audience members connecting with media characters.

Identification with Media Characters

Connecting with the character/s in a narrative can enhance narrative effectiveness. In fact, this appears to be a crucial determinant of behavioral change (Larkey & Hecht, 2009; Slater & Rouner, 2002). According to Shrank and Engels (1981) identification of the audience member with characters in the narrative is a prerequisite to gaining insight. Precisely what “connecting with media characters in a narrative” entails has been conceptualized in slightly different ways by various researchers. There is still no consensual agreement among scholars (Murphy, 2009). The meaning of identification with media characters has ranged from perceived similarity, liking, empathy for characters, and wishful identification including parasocial relationships. Zillmann (1994) pointed out that identification means that the knowledge of the audience members is processed from the character’s point of view and is transformed into empathic emotion. Cohen (2001) similarly conceptualized identification as a process that leads to the temporary adoption of an external point of view and to viewing the world through an alternative social reality.

The extant literature has shown that identification conceptualized as external similarities between audience and media characters (e.g., demographics) is an inconsistent predictor of narrative effectiveness (Andsager, Bemker, Choi, & Torwel, 2006; Brosius, 1999; Guttman et al., 2008). Cohen’s (2001) conceptualization of identification, which is based in an audience response of empathy for media characters and temporarily adopting their perspective (i.e., what Sood (2002) refers to as referential reflection), appears to hold promise for yielding a more reliable measure of identification and was adopted in the present study. A media character’s ability to elicit an emotional connection of empathy and have audiences experience their viewpoint seem to be central

to persuasive effects of narratives in promoting health behaviors (Kreuter et al., 2007; Larkey & Hecht, 2009).

Identification with media characters allows the audience to experience social reality from other perspectives and thereby, shape social attitudes. Like transportation, identification with media characters is expected to increase immersion, reduce counterarguing, and increase viewers' acceptance of the values and beliefs portrayed in a narrative (Slater & Rouner, 2002). Additionally, identification appears to be positively related to increased attention, mental rehearsal of the arguments presented, and modeling of behavior (Sood, 2002). The importance of identification with media characters has been recognized across theories of narrative communication (Larkey & Hecht, 2009; Moyer-Guse, 2008; Slater & Rouner, 2002). This recognition is grounded in the notion that identification with media characters can have important effects on willingness to accept messages and that message acceptance moves audiences closer to adopting advocated behaviors.

The conceptual relationship between narrative transportation and identification is murky. Although narrative engagement and identification with media characters reflect distinct concepts there is some overlap when they are understood as audience responses. Many narrative theorists (Cohen, 2001; Hecht & Larkey, 2009; Miller, 1998; Moyer-Guse, 2008; and Slater, 2002) acknowledge that the relationship between transportation and identification has not yet been clearly specified—transportation could precede or come after identification. Miller's (1998) conceptualization of narrative engagement (similar to transportation) encompasses identification. While viewers are engaged in a narrative, they are more likely to become involved with the characters and vice versa.

One might argue that for one-shot exposures to narratives (e.g., testimonials or exemplars) that the performance of the individual is crucial in order for identification to occur. If the character performance is not compelling, then audiences will disengage. On the other hand, narrative themes must speak to audiences, otherwise they will not identify with the media characters. The present research attempts to parse out the directional associations between identification and transportation. Finally, an often neglected issue is that in video or film narratives (such as presented in the current research), identification and transportation may be promoted or inhibited by the technical production features. This is referred to as vividness in the current study.

Vividness

Vividly presented narratives are generally thought to be more persuasive. Vivid narratives or exemplars attract attention, evoke emotion, and are remembered to a greater extent (Sundar, 2003; Taylor & Thompson, 1982; Zillmann & Brosius, 2000). Nisbett and Ross (1980) define vividness by exemplar ability to elicit emotionally interesting and proximal (in a sensory way) information while Taylor and Thompson (1982) define vividness by its ability to produce mental imagery. Biocca (2002) on the other hand, defines vividness by the sensory richness of a medium. Biocca's definition of vividness is adopted in the present study.

Narratives delivered in film or video mediums may transport audiences to a greater extent than texts because of their vividness (Busselle & Shrum, 2003; Sundar, 2003; Zillmann, 2002). High quality video format could increase transportation and identification relative to a web-based medium (text-only) by increasing the feeling of presence (Green et al., 2009). Vividness in this sense allows audiences to experience

narratives as if they were real world encounters with the exemplars functioning as surrogates. The sensory richness of video delivered exemplars may increase the ease or fluency with which individuals enter a narrative world. The visual presentation including the acting or “performance” may be especially powerful (Miller-Day, 2008b). Gerrig and Prentice (1996) suggested that the formal properties of video or film particularly in the way it focuses viewers’ attention may make some types of immersion more likely. Additionally Gerrig (1996) brought attention to the formal properties of video narratives being interpreted with a heightened perception of realism.

Perceived Realism

Miller (1998) has pointed out that for narrative engagement to occur, establishing the perception of realism appears to be necessary. Drama theorists also note that perceived realism can be critical to eliciting emotional responses including establishing connections with media characters. If the acting (i.e., the performances) of exemplars as well as the narrative themes are perceived as unrealistic or not authentic then increased disengagement is likely to occur. This was found to be the case in several studies employing narratives for health promotion (Fishbein, Hall-Jamieson, Zimmer, Von Haefen, & Nabi, 2002; Greene & Brinn, 2003; Guttman et al., 2008; Hall, 2003). Therefore, perceived realism understood as authenticity has been identified as a crucial determinant of persuasive narratives (Petraglia, 2009).

Perceived realism of narratives has been conceptualized not only as authenticity, but also as plausibility (Brinson & Brown, 1997; Fisher, 1987; Pennington & Hastie, 1993). Pennington and Hastie (1993) ascribe narrative effects to the perceived plausibility and coherence of narratives—Does the narrative makes sense? Is it believable? Does it

ring true? Assessing plausibility occurs during the process of interpreting narratives for decision-making with the most plausible narrative being the most compelling (Pennington & Hastie, 1993).

As with other narrative mediators, perceived realism has been conceptualized in different ways in the literature—as authenticity, plausibility, believability, and coherence. While the importance of narrative plausibility to predict effectiveness of narratives has received less attention in the entertainment-education literature, its importance has been recognized by drama scholars (Kincaid, 2002) and in the media realism literature (Busselle, Ryabovolova, & Wilson, 2004; Hall, 2003). In this study, perceived realism is conceptualized as the authenticity and plausibility of exemplar narratives.

To summarize this section on narrative mediators, the extant literature delineates at least four hypothesized causal mechanisms explaining how narratives impact behavioral attitudes, intent, and behavior: narrative transportation, identification with media characters, vividness, and perceived realism.

Overall Summary of Narrative Literature

A review of theories that inform narrative message design led to identifying culture-centric narrative and exemplification theory as providing frameworks for the process of designing the narratives for a video intervention promoting HPV vaccination to college-aged women. Culture-centric narrative theory emphasizes the importance of deriving the justifications for health behavior change *from* the intended audience. This is often achieved by enlisting the views of the intended audience in narratives, and using these narratives as the health message. Employing narratives for health campaign communication in which the narratives are culturally grounded (Hecht & Krieger, 2006),

is more likely to result in the messages resonating with the intended audience and thereby, exerting influence. Exemplification theory, which also endorses the idea of employing prototypical narratives for persuasion purposes, recognizes that narratives are interpreted for the views they represent (i.e., which side of the story they reflect) and that including narratives that reflect both sides of an issue will result in the overall story being perceived as more credible and thereby, exert influence on individual's attitudes. The formative research findings, documented in the first study of this dissertation, reflect HPV vaccine decision narratives of college women. These decision narratives shaped the content of the narrative intervention in study two.

A review of the literature also delineated four conditions for which narratives show particular promise in advancing health promotion. These include narrative communication forms rendering complex information comprehensible, reaching resistant audiences, engaging less involved audiences, and rendering culturally relevant health messages that resonate with audiences.

Finally, the last section of the literature review summarizes hypothesized causal mediators of narrative processing to explain how narratives impact behavioral attitudes, intentions, and behaviors. These audience-centered theories explain how narratives impart message impact. Four hypothesized mediators of narrative processing are delineated: narrative transportation, identification with media characters, vividness, and perceived realism. See Table 2.1 for a review of narrative theories and Figure 2.1 for an integrated narrative communication model for health promotion.

Table 2.1

Summary of Narrative Theories Applied to Health Message Design

Theory ¹	Message\Audience Centered ²	Message Goal\Narrative Advantage\Narrative mechanism
Story Theory	Audience	Individuals impose story structures when making sense of complex information\ Narrative plausibility important for decision-making
Narrative Comm. in Cancer Prevention	Audience	Facilitates health decision-making\reduces counterarguments\implicitness
E-ELM	Audience	Edutainment\reduces counterarguments\narrative transportation\ Identification with media characters
Edutainment-Education (EE)	Audience	Edutainment\reduces resistance
Transportation	Audience	Persuasion\reduces counterarguments\psychological immersion into the story
Exemplification	Message	Persuasion\elicits emotional response to message\exemplar vividness
Culture-Centric Narrative	Audience	Culturally derived “proof”\authenticity\identification
Cultivation Theory	Audience	Perceived authenticity\plausibility realism
Drama Theory	Audience	Entertainment\elicits empathy

Note. E-ELM = Extended Elaboration Likelihood Model

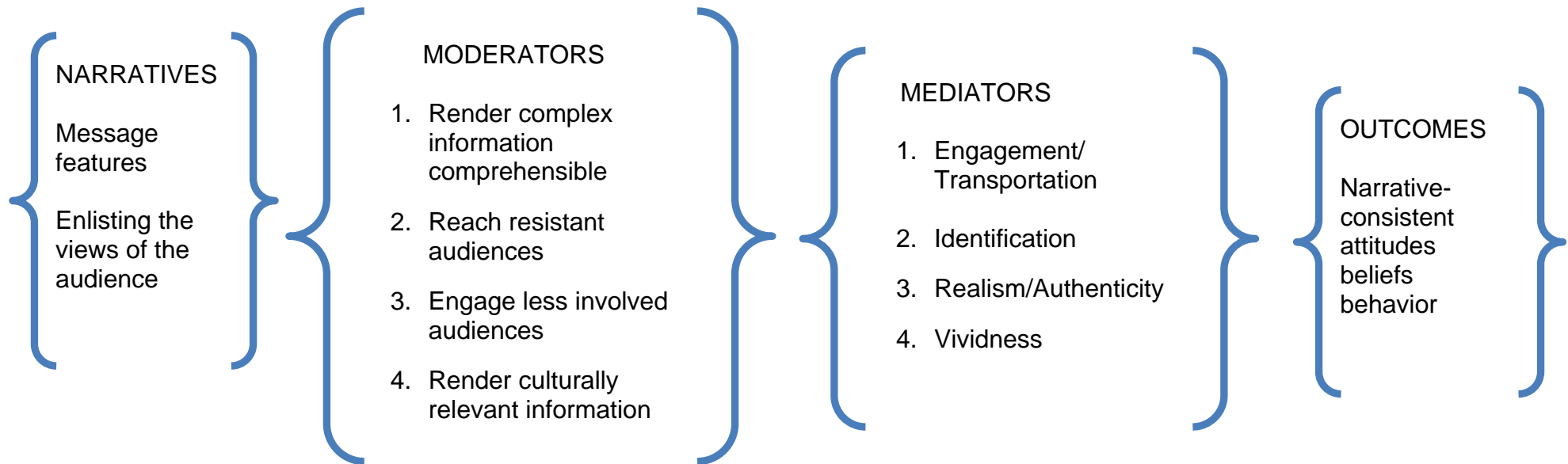
¹Story Theory (Pennington & Hastie, 1993), Narrative Communication Theory in Cancer Prevention (Kreuter et al., 2007), Extended-Elaboration Likelihood Model (Slater & Rouner, 2002), Edutainment-Persuasion (Moyer-Guse, 2008), Transportation-Imagery

Theory (Gerrig, 1993; Green & Brock, 2000), Exemplification Theory (Zillmann, 1999), Culture-Centric Narrative Theory (Larkey & Hecht, 2009), Cultivation Theory (Busselle et al., 2004), Drama/Performance theory of aesthetic engagement (Berleant, 1991; Miller et al., 1998)

²Message/audience centered = The locus of theoretical orientation situates explanations of narrative either in information processing of narratives (audience centered) or in a priori ideas about narrative message features (message-centered).

Figure 2.1

Narrative Communication Model for Health Promotion



Chapter Three

College Women's Decision Narratives of HPV Vaccine Acceptance and Resistance

Abstract

Drawing on 38 in-depth qualitative interviews with college women and college health clinicians, HPV vaccine decision narratives were collected to identify the often implicit values underlying HPV vaccine decision-making. Narratives of vaccine acceptance and resistance were identified. Vaccine acceptance narratives consisted of 4 themes: supportive family messages, explicit health care provider endorsement, peer descriptive norms normalizing vaccination, and disease framing (e.g., cancer, HPV) shaping vaccine benefit perceptions. Vaccine resistance narratives consisted of 5 themes: skepticism of vaccine safety, invoking alternative prevention strategies, articulating stigmatizing HPV messages, overcoming self-efficacy barriers (e.g., cost, availability, time, and fear of parental disclosure), and delay strategies. Common to all decision narratives was that relationship status framed college women's perceptions of HPV susceptibility. Theoretical and practical implications for designing HPV vaccine messages aimed at college-aged women are discussed.

Keywords: decision narratives, narrative inquiry, HPV vaccine

College Women's Decision Narratives of HPV Vaccine Acceptance and Resistance

The purpose of this interpretative study was to increase understanding of the meanings college women ascribe to HPV vaccine messages they receive from family, peers, and health care providers. College women were interviewed (as were two college health clinicians) to share their storied accounts of HPV vaccine decision-making and for those not yet vaccinated, to share what they believed influences their HPV vaccine attitudes and decisions.

When recounting experiences to others, humans impose narrative structures. A narrative approach to understanding HPV vaccine decisions is premised on the idea that soliciting stories of how college women make sense of HPV-related experiences and messages from family, peer, and health professionals, is a key way of coming to understand the assumptions held by this target population. By using narrative inquiry as a method; that is, examining the decision stories of these women, I can identify the underlying assumptions these stories embody. It is important to uncover the underlying assumptions that accompany college women's HPV vaccine decision-making given that increased understanding of these assumptions will facilitate designing effective HPV vaccine messages aimed at reaching college women.

Significance of the Study

Why do we need a better understanding of college women's HPV vaccine decision processes? There are several reasons. First, because a substantial proportion of the female college population (approximately 60%) has not been vaccinated for HPV and this fact undermines public health progress on women's health (Dunne et al., 2007). In stating this I reveal my own personal biases here—that I believe HPV vaccination is safe and that it is in the

interest of women's long-term health to adopt the vaccine for the protection against HPV, which has been linked as a necessary cause of cervical cancer, to head, neck and anal cancers, and to increased risk for premature birth (Sjoberg & Esild, 2009; Walboomers et al., 1999). Second, I believe there is a need to better understand college women's vaccine decision processes because college-aged women stand to significantly benefit from HPV prevention. The highest risk time frame for HPV acquisition includes the college years during ages 17-26 (Dunne et al., 2007). Public health efforts have surprisingly neglected college-aged women in this prevention effort, focusing largely on 9-12 year old girls. Third, if we are to develop effective HPV vaccine promotion campaigns we need to thoroughly understand the decision processes of our intended audience. Finally, a richer understanding about the "why" and "how" behind HPV vaccine attitudes will inform the successful design of an HPV vaccine promotion campaign aimed at this age group and if successful, will translate into increased vaccine adoption, and in turn, reduced morbidity related to HPV infection.

HPV, its Link with Cancer, and the New Vaccine

The HPV vaccine is the first of its kind to prevent both a sexually transmitted infection and indirectly, cancer. The recognition that HPV infection is a necessary cause of cervical cancer ushered in a new prevention paradigm for cancer screening and HPV immunization (Franco et al., 2006). The subsequent introduction of the HPV vaccine to the public in June 2006 left the healthcare community with little guidance on how to present the benefits of the vaccine. This situation presented a new challenge in health message design because promotion of the vaccine raises questions inextricably linked to sexual health and cancer—both topics that are culturally sensitive and taboo. As a result of this sensitivity, it is particularly important to understand the contexts in which messages around HPV vaccination arise, how messages are interpreted, and

how they may be presented in more and less effective ways—information that is essential to designing effective HPV vaccine promotion campaigns.

The goal of this study was to better understand college women's HPV vaccine attitudes and beliefs with a lens focused on (a) the family, peer, and health care provider messages that college women report receiving about HPV, and (b) how college women interpret, respond and incorporate these messages to shape their own HPV vaccine attitudes and decisions. A theoretical *lens* refers to applying theory to direct and focus the examination and interpretation of qualitative data.

Theoretical Framework: Norms and Narrative

Previous HPV vaccine literature has indicated the importance of normative messages shaping women's HPV vaccine attitudes (Kahn, 2005; Kahn, Rosenthal, Hamann, & Berstein, 2003; Ogilvie et al., 2007). Cialdini and Reno (1990) argued in their focus theory of norms that social norms affect human behavior and that social norms are best understood by exploring (and differentiating) (a) what is commonly *done* by important others in one's social network (i.e., descriptive norms), (b) what is commonly *approved* and *disapproved* by important others in one's social network (i.e., injunctive norms), and (c) how internalization of norms regulates behavior (i.e., personal norms).

For a richer understanding of the HPV vaccine attitudes of college-aged women, eliciting the descriptive and injunctive normative messages that college women receive about HPV and eliciting personal norms around HPV warrant exploration. Literature on sexual health communication of emerging young adults confirms that family and peer messages are an important area of investigation for their influence on attitudes (Boone & Lefkowitz, 2004; Miller-Day, 2008a).

In addition to a normative lens on understanding college women's attitudes toward the HPV vaccine, narrative theory (Fisher, 1987) provides a useful framework for understanding the meanings that college women ascribe to the HPV vaccine messages they receive in daughter-parent as well as peer and health care provider communication. Thus, a narrative lens frames understanding around the meaning of HPV messages by listening to the ways in which college women make sense of the family, peer, and health professional HPV vaccine messages they receive. What women choose to include in their decision stories and how they ascribe meaning to messages and events reveals key assumptions that shape their attitudes and behavior. Moreover, a narrative framework (i.e., college women's storied vaccine decision accounts) sheds light on the larger social and cultural framework within which college women operate. Thus, a narrative and a normative lens frame the focus in understanding the assumptions of college women's HPV vaccine decision narratives.

Narrative as Culture Centric Method of Inquiry

Narrative inquiry will be employed in this study given that the method is well suited to uncover the assumptions underlying HPV vaccine attitudes. Narrative inquiry attempts to understand how people think through events and what they implicitly assume (Fisher, 1987; Riessman, 2008; Riley & Hawe, 2005). This method of inquiry conceptualizes human thought and behavior as based in stories, a transcultural mode of discourse through which people organize information and experiences of the world (White, 1981). In doing so, narrative inquiry lends three types of validity to health message design: experience, relevance, and cultural validity (Miller-Day, 2008b; Petronio, 2007). "Experience validity" is enhanced by accounting for the lived experiences of those being studied, while "relevance validity" is accomplished when health messages are relevant to the intended audience's lives. Finally, "cultural validity" is

enhanced when translating research findings into practice and norms, routines, and values that are represented with accuracy and honesty. With the goal of designing promotional vaccine messages, identifying narratives grounded in the dominant stories reported by college women will provide the source material for health messages that are more likely to be relevant to and resonate with college women (Hecht & Krieger, 2006; Hecht & Miller-Day, 2009).

College Women and HPV Vaccine Decision-Making

While audience targeting and tailoring may always be a desirable strategy for health message design (Kreuter & Wray, 2003), this is particularly important with sensitive topics such as HPV vaccination (Kahn et al., 2008). Unfortunately, little is known about the types of messages that college women receive regarding HPV vaccination and, as a result, which messages will engage women to consider vaccination. Reaching college-aged women during emerging adulthood when transformations in identities, changes in social relationships, and independent living situations arise can be challenging in any case (Boone & Lefkowitz, 2004; Lefkowitz, Boone, & Shearer, 2004), but is particularly so with stigmatized topics such as HPV. College women are increasingly confronted with opportunities to engage in risk-taking behaviors including sexual behaviors at college. These students often delay or avoid seeking testing for sexually transmitted infections even if the services are readily available (Barth, Cook, Downs, Switzer, & Fischhoff, 2002). Additionally, women who may not be dating anyone or who may already be dating but in a monogamous relationship may be less inclined to listen to HPV vaccine messages. As a result of these social processes and pressures, previous research on the HPV vaccine attitudes of college women points to the importance of examining normative messages (Brewer & Fazekas, 2007; Downs et al., 2008; Downs et al., 2004; Kahn, 2005; Kahn et al., 2003).

Peer Norms around HPV Vaccination

Developmental changes during the transition to college lead women to increasingly turn to or at least be exposed to normative cues regarding a variety of social behaviors. College women often observe how their roommates, friends, and sexual partners act with respect to protective STI behaviors (or the lack of) (Kahn, 2005; Rouner & Lindsey, 2006). These personal as well as peer descriptive and injunctive norms shape college women's HPV vaccine attitudes and practices by serving as validity cues (Allen et al., 2008; Kahn et al., 2003; Kahn et al., 2008; Ogilvie et al., 2007). While peer norms are clearly important, many college women still turn to their parents when it comes to health matters, including vaccine recommendations (Allen et al., 2008).

Family Messages around HPV Vaccination

Parents' HPV vaccine attitudes play an important role in vaccine adoption however, prior studies that show the role of parents were conducted in adolescent girls (Constantine & Jerman, 2007; Downs et al., 2008; Kahn, 2007). The role of parent and sibling messages in college-aged women's HPV vaccine decisions has yet to be explored. When it comes to vaccination, despite increasing independence during emerging adulthood, college-aged women may still rely heavily on family messages. Formative research is needed to describe the family messages that college-aged women report receiving about the HPV vaccine.

The Medical Expert Message around HPV Vaccination

Many college women visit their doctors before attending college since a physical and the mumps, measles, and rubella vaccine is required for college attendance. Little is known however, about the messages that college women receive from their doctors at these visits and the extent to which they comply with them. Furthermore, while a medical checkup may be required to enter

college, college-aged women often move through young adulthood without preventive medical visits given their transitory lifestage. Because there are no practice guidelines on how health professionals should communicate about the HPV vaccine and clinical emphasis has been on 9- to 12-year olds, it is not clear what proportion of clinicians even raise HPV vaccination with their female college-aged patients nor is it known what they say. While catch-up vaccinations are recommended for women up to the age of 26 by the Federal Drug Administration, the extent to which clinicians actually and explicitly recommend HPV vaccination to these college-aged patients is not known.

Thus, drawing on the relatively recent HPV literature and utilizing the theoretical frameworks of the focus theory of norms and narrative theory, the following research questions guided this exploratory study on HPV vaccine decision narratives.

- RQ1: What assumptions underlie college-aged women's decisions to accept or resist the HPV vaccine?
- RQ2: What meanings do college-aged women ascribe to the family, peer, and health care provider HPV vaccine messages they receive?
- RQ3: What is college women's understanding of HPV susceptibility?

Method

Semi-structured interviews were conducted with 36 college women and 2 college health clinicians to elicit HPV vaccine decision narratives. The content of these narratives was analyzed through inductive analysis, applying strategies of constant comparison to identify recurrent or patterned assumptions underlying college women's HPV vaccine decisions.

Participants

Socio-demographics. Interviews were conducted from April 2nd to May 25th 2008. The mean age of participants was 20 ($SD = 1.4$). Half of the student interviewees were in their second year of college while 30% were in their junior year, 11% were in their senior year followed by 8% in their first year in college. Nearly 90% (32/36) were Caucasian while the minority were of Asian-American (8%, $n = 3$) and African-American ethnicity ($n = 1$). One-fourth of the sample came from rural areas ($n = 9$) while three-fourths ($n = 27$) were raised in suburban neighborhoods. All but one participant reported having health insurance coverage. Two participants were married.

The two medical health experts who were interviewed worked in campus student health. Both informants had nearly 30 years experience working in both women's and college health.

Sexual Activity and STI Protective Behaviors. Of the 36 college-aged women interviewed, slightly more than half (53%, 19/36) were sexually active. Among the unvaccinated group ($n = 22$), 50% were sexually active ($n = 11$). Of those who were sexually active ($n = 19$), 42% (8/19) reported using condoms every time during sexual intercourse followed by 32% (6/19) who reported using condoms more than half the time; 11% (2/19) less than half the time during sexual intercourse; and 16% (3/19) reported never using condoms. Of the 36 women, two reported being diagnosed with HPV.

Procedures

After receiving institutional review board approval, 36 undergraduate women aged 18-25 and 2 medical professionals were contacted to participate in this study. The female college students attended a large northeastern university and were recruited from speech courses. Students who were enrolled in a speech course were required to participate in a research study as part of their course learning objectives. Students were assigned to the study by a research study

coordinator after meeting eligibility criteria (female, aged 18-26, responded yes to having heard of the HPV vaccine). After receiving an email list of eligible participants from the research study coordinator, I contacted the 37 female college students by email, inviting them to participate in an in-depth interview about the HPV vaccine, and to schedule a 40-minute in-person interview. Students had the alternative of viewing and critiquing a speech online if they did not wish to participate in the study. One woman opted for the alternative assignment. Students received 2% course credit once they participated in the interview.

Students who fit the criteria were divided across two dimensions: *vaccinated* and *not yet vaccinated* as well as *sexually active* and *not currently sexually active*. The four stratified groups (across the two dimensions) were based on a literature review indicating these criteria had relevance for HPV vaccine attitudes and based on maximizing the possible range in ascribed meanings relevant to enacting actual vaccination. Because this study would inform a future HPV vaccine promotion campaign aimed at reaching the unvaccinated, a greater number of women were interviewed who were not yet vaccinated. Therefore, a majority of those interviewed (two-thirds; $n = 22$) were unvaccinated while one-third of the women ($n = 14$) were already vaccinated.

The two clinicians interviewed were sought out given their extensive experience working with college-aged women. They were approached by the researcher and asked if they were willing to be interviewed to share their experiences seeing patients (college women) for HPV infection and discussing vaccination. They both agreed to be interviewed, after which appointments were scheduled to meet them in their offices at a time of convenience for them and have a one-hour in-depth interview.

Instruments

Interview Guide to Interview College Women. HPV vaccine decision narratives were solicited by conducting in-depth, semi-structured interviews with the participants. The interview was comprised of a prepared set of topics, but within discussion of those topics participants were encouraged to talk about what they felt was most important and to frame this talk in ways that seemed most personally relevant. Vaccination decision narratives were solicited with a lens toward (a) identifying the family, peer, and health care provider messages that college women reported, and (b) having college women reflect on how these messages shaped their HPV vaccine attitudes, beliefs, and vaccination decisions.

College women were asked open-ended questions about how they would go about or have gone about deciding whether to vaccinate for HPV (Appendix A, for a sample of the interview guide see Table 3.1). Decision narratives were elicited by asking, “Let’s talk a little bit about your decision to get the HPV vaccine. Will you tell me about how that came about?”

Table 3.1

Sample Questions from Interview Guide for Soliciting Vaccine Decision Narratives

Let’s talk a little bit about your decision to get the HPV vaccine. Will you tell me about how that came about?

How did you go about deciding? How did that come about?

Did you talk with anyone before deciding?

Did your health care provider talk to you about the vaccine?

What do you think about what they said?

If participants had not had the HPV vaccine (i.e., answered no to screening question #2 in the pre-interview screening questionnaire, see Appendix B), then an alternative set of open-ended questions was asked including, “Let’s say your health care provider mentioned something about the HPV vaccine to you. How do you think that conversation might go? Try to include the

sorts of things you might think to yourself as you were talking with this person.” Probes were used to follow-up such as “Do you think you would talk to anyone before deciding to vaccinate?” “If yes, who would that be and please tell me what you might be thinking”. This hypothetical scenario was asked of participants who had not yet been vaccinated to solicit how they might go about making their decision.

Probing follow-up questions were used while listening to college women’s storied accounts of vaccine decision-making with the first set of questions exploring health care provider messages: “Did your health care provider talk to you about the HPV vaccine?” “What did they say?” “What do you think about what they said?” These questions were followed up by probes about family messages: “Have you talked with your parents about the HPV vaccine?” If yes, “What do they say?” and if no, “Why not?” These probes were followed by exploration of peer messages (if they had not already come up during the interview): “When talking with your girlfriends/roommates/boyfriends have conversations about the HPV vaccine ever come up?” If yes, “What did you talk about?”, “Have your girlfriends, roommates, sisters gotten vaccinated?” Peer messages about HPV with boyfriends were also explored with participants who were currently dating: “Have you and your boyfriend ever discussed the HPV vaccine?”

A third set of questions probed college women about their personal HPV vaccine norms: “What do you think about HPV vaccination personally?” “Do you think college-aged women should get the HPV vaccine?”, “Do you think your girlfriends should get the HPV vaccine?” and “What are your beliefs about the consequences of not getting the vaccine?”

Finally, a fourth set of questions explored college women’s HPV vaccine attitudes in relation to their sexual activity. If participants responded Yes to the screening question, “Are you currently sexually active?”, this response was explored further with informants by asking, “So

tell me a little bit about your relationship with X?” “Has the HPV vaccine ever come up in conversations?” Follow up probes centered around what would make informants feel vulnerable to HPV acquisition, “What would make you feel vulnerable to acquiring HPV or other STIs?”, “Why is that?”, “Tell me more about how and why you feel this way?” (see Appendix A for complete interview guide).

Interview Guide to Interview College Health Clinicians. The in-depth interviews with college health clinicians were designed to capture the medical perspective on what the range of issues were that may lead college women to vaccinate or not vaccinate for HPV as well to gather medical accounts of the effects of an HPV diagnosis. These interviews served as data triangulation; that is, involving participants in different roles to “cross-check” the findings (Denzin, 2006). Triangulating data sources increases the validity of the study findings by providing a more detailed and balanced picture and an opportunity to search for regularities in the research data across sources (O'Donoghue & Punch, 2003). For a detailed interview guide see Appendix C.

Clinicians were asked to share their experiences of how the topic of HPV and vaccination arises in clinic settings, what primary concerns college women voice, and what medical points clinicians deem important to emphasize (see Appendix C). A range of issues were probed including (a) the contexts in which HPV vaccine arises (STI testing, contraceptive counseling), (b) who typically raises the issue (clinician or patient), (c) what issues emerge as barriers (e.g., cost, fear of parental disclosure), and (d) what issues emerge as facilitators (e.g., preventing cancer, parental support, diagnosis of HPV). Clinicians could also attest to the proportion of college women coming to the University Health Services for HPV infection visits and for HPV vaccination.

Interview Procedures

College-student interviews were conducted in private interview rooms at the university library and the medical health expert interviews were conducted in their private offices. Interviews were audio-recorded. Prior to the interview, college student participants completed a questionnaire asking whether they had heard of HPV, about their HPV vaccination status, HPV knowledge, their current relationship status, use of STI protection (e.g., condom use), history of STIs, and for their socio-demographic information (e.g., age, ethnicity, insurance coverage, major) (Appendix B, pre-interview questionnaire).

Each interview then began with an open-ended question that led participants to reflect upon their HPV vaccination decision (if they answered yes to screening question 2) or asked participants to respond to a hypothetical scenario (if they answered no to screening question 2) and proceeded in a relaxed, conversational style (for detail on the interview questions see Appendix A).

Analytic Procedures

Data Preparation. The data from all in-depth interviews were transcribed verbatim by the researcher. Pseudonyms replaced names of participants as well as names of friends in stories (i.e., any identifying information) to ensure participant confidentiality. Each informant was emailed a transcript of her interview for the purpose of confirming the accuracy of the transcript and making sure that the content reflected what informants intended to say. Each of the 38 informants responded that she had reviewed her transcript and the content reflected her contributions accurately. Data management software was not used for this project. Instead, transcribed interviews were numbered line by line in a word processing program. As the primary instrument of the data, I immersed myself in the data of the in-depth interviews by listening to

the data repeatedly—both the audio-recordings (about five times) and re-reading the written transcripts (about ten times or more) and then conducted a line-by-line analysis of the data.

The next section details the coding process. The coding process was conducted in three phases to answer the research questions. The first phase of coding sought to uncover the underlying assumptions in college women's decisions to accept or resist the HPV vaccine. An inductive approach was used to identify emergent themes in this first phase of coding. The second coding phase sought to more specifically identify and describe the family, peer, and health care provider messages that college women reported receiving. Hence, a second analysis of coding tagged the data for peer, family, and provider messages. Finally, in a third phase of coding, college women's interviews were analyzed for whether their decision narratives (i.e., the unit of analysis for this coding phase was the entire interview) reflected acceptance or resistance of HPV vaccination. I turn now to describing the three coding processes in more detail.

Coding & Constant Comparison. The first stage of coding set out to answer the research question: "What assumptions underlie college women's decisions to accept or resist the HPV vaccine?" Once I felt familiar with the data I began the inductive approach of developing conceptual categories through tagging, labeling, and constant comparison. *Tagging* refers to the process of selecting meaningful segments of the material that are relevant to the purpose of the study (Babiste, 2001). After tagging the data segments, I provided the segment with a label. Segment labels sometimes emerged from the text itself (e.g., cancer prevention is worthwhile) or I imposed the labels meaningfully related to the data. Once the meaningful segments of the material—the data—were tagged and labeled, I compared and contrasted all segments and organized all data with similar characteristics into the same group or category. As noted by

Strauss and Corbin (1998) this type of analysis allows for the interplay that takes place between the data and researcher, where the researcher is actively reacting to and working with the data.

Coding the interview data, thus, consisted of examining, comparing, conceptualizing, and categorizing the data. Unifying ideas were identified based on recurrent ideas and phrases expressed in the data and categorized into a meaningful group. These unifying ideas were identified by recurrence in the data (e.g., same idea expressed multiple times), repetition (e.g., reiteration of key words or phrases), heightened consensus or agreement about an idea across participants and or by the intensity with which the idea was expressed (e.g., emotional tone and intensity). Meaningful data segments, which constituted the units of analysis ranged from single words to 5 sentences.

A second round of analysis was then performed to address the a priori established domains namely, to identify and characterize the family, peer, and health care provider messages that college women reported receiving about the HPV vaccine. Thus, the data were analyzed in this second analysis to identify, tag, and sort messages by whether they were peer, family, and health care provider messages. The messages were then also coded for their valence, i.e., whether these messages were supportive of vaccination (i.e., accepting) or whether the messages were discouraging or skeptical of vaccination (i.e., resisting).

Finally, as the last step in coding, transcripts were coded for whether the informant's interview (i.e., narrative) as a whole reflected HPV vaccine acceptance or resistance. Criteria for coding each transcript as accepting of HPV vaccination included: explicit mention of HPV vaccination intention, having already been vaccinated, explicit statements that vaccination made sense and was worthwhile, and acknowledgement that if the doctor recommended vaccination the participant would likely vaccinate (i.e., indicating intention). Vaccination resistance included:

explicit skepticism about HPV vaccination, explicit messages of non-intention to vaccinate, explicit messages that the vaccine was not necessary for prevention, explicit messages that the vaccine was appropriate for only certain individuals (e.g., those who are promiscuous) unlike the informant, or explicit messages about any type of barrier preventing vaccination (e.g., cost, lack of insurance, or parental disapproval).

Interrater Agreement

A second coder was included in the data analysis beginning with the first stage of coding. This was done to strengthen the validity of findings and as a member checking procedure. Thus, the purpose of including a second coder was to negotiate the interpretation of emerging themes with a member of the intended audience to ensure that data interpretation reflected and resonated with “the female college student’s point of view”. As a result, percent agreement (i.e., quantifying qualitative findings) was not the primary goal and was therefore, not computed during initial coding procedures. The second coder was deliberately chosen because she was a female college-aged student who had been vaccinated.

The second coder was trained to first read all of the 38 transcripts and to reflect on her initial responses to what the emerging themes were. I explained to the coder that she was to be aware of her own biases (having been vaccinated) while reading the transcript and she was to reflect on her own reactions while reading and interpreting the data. Thus, in the initial round of coding of phase I, the two coders met to discuss and negotiate the interpretation of the emerging themes in vaccine decision-making for college women. Discussions were iterative and the second coder was instructed to verify that the data interpretation “rang true” from a female college student’s point of view. The purpose of the second coder was to member check, rather

than quantifying the qualitative findings. For this reason, Cohen's kappa was not calculated initially.

In the second round of analyses, both researchers coded the transcripts using the a priori domains of family, peer, and provider messages, the themes under which these family, peer, and provider messages were labeled, as well as personal norms and what college women believed influenced their vaccine decisions as well as how college women responded to questions about HPV susceptibility. The two coders met several times to ensure consistent interpretation of the coding criteria.

For the final round of analyses, the data were interpreted for whether participant narratives (unit of analysis was the interview) reflected vaccine acceptance and resistance. Coder discrepancies on two transcripts were discussed and resolved. In both these transcripts, participants did not oppose vaccination generally but denied being at risk for HPV and therefore, denied the need for the HPV vaccine. After discussion among the coders, one of these narratives was ultimately coded as *accepting* since the participant conceded during the interview that if the doctor recommended vaccination she would probably comply. The other case was coded as *resistant* since the participant expressed a non-intention to vaccinate. Final coder agreement resulted in a Cohen's κ of 0.92 of decision narratives of vaccine acceptance and resistance.

Trustworthiness Criteria

Qualitative research should be based on research designs that demand a vigorous self-reflexivity (Lather, 1991). In other words, qualitative research designs should employ methods that can attest to the credibility or accuracy of the information obtained in the study (Miller-Day, 1998). Four techniques were employed to establish data trustworthiness. These included *credibility, confirmability, dependability, and transferability*.

Credibility is an evaluation of whether or not the research findings represent a “credible” conceptual interpretation of the data drawn from the participants’ original data (Lincoln & Guba, 1985). To enhance credibility, I employed two strategies. First, I triangulated data sources by interviewing both college students and medical personnel. By interviewing both college women and college health clinicians on the subject of HPV and the vaccine I used multiple sources and perspectives to gain a multi-perspective approach to understanding the key factors relevant for college-aged women in relation to HPV vaccine decision-making. I utilized therefore, two layers of data to confirm that the data offer credibility. For instance, having topics arise in the reports of both college health clinicians and college women strengthened the credibility of key themes in the data interpretation process. This occurred for several themes, for example fear of discussing HPV vaccination with parents, and that college women’s conceptualizations of self-risk for HPV were understood by their current sexual relationship status.

The second strategy used to enhance credibility was the use of a college-aged woman to review my interpretation of the data and provide me with feedback as to whether these interpretations rang true. She was instructed to review the data both through the lens of her personal experiences (she was vaccinated) and through her impressions of peers whose conversations about HPV she overheard. When she confirmed that the interpretation of the data resonated with her own experiences and those of girlfriends, this enhanced credibility of the findings.

We move next to the issue of *confirmability*, a measure of how well the inquiry’s findings are supported by the data. One way in which confirmability can be verified is that the verbatim transcripts of the in-depth interviews are readily available upon request from the author, and, that the codebook detailing the themes and subcategories of the data interpretation process are

included in this document as well as notes documenting the series of quotes and lines of transcript from the data with linked codes tracing themes directly to transcript lines (see for example, Appendix D).

The third technique that enhances trustworthiness of the data interpretation process is *dependability*. Dependability is an assessment of the quality of the integrated processes of data collection, data analysis, and theory generation. Dependability suggests that the researcher can assure the process as “logical, traceable, and documented” (Schwandt, 2001) and has been confirmed through several means including: (a) purposive sampling (previously discussed), (b) theory guiding the research, and (c) an audit trail, i.e., a careful accounting of the researchers’ process through a “paper” trail. The data collection and interpretation process was meticulously documented and begins with the availability of the original audio data (e.g., in which tone in meaning is captured), availability of the verbatim transcripts (in print in a binder) in which each transcript line was numbered, and subsequent coding of themes and subcategories can be readily retrieved and linked to its original source (with themes and the original transcript having corresponding numbers).

Finally, the last technique employed to enhance trustworthiness, was addressing *transferability* of these findings. Transferability is the degree to which the findings of this inquiry can be applied or transferred beyond the bounds of this project. By providing “thick” descriptions of the procedures, sampling methods, and most importantly the decision narratives of college-aged women, the results present valuable and practical information to other college health centers aiming to effectively reach college-aged populations. Claims are not made about populations outside of the boundaries of the study, however, enough information is provided to determine to whom the findings might also be applied. Transferability in this study is also

enhanced by providing the excerpts of the raw data at the end of this document (see Appendix D) with all data relevant to the project available upon request by the principle investigator.

Findings

The purpose of this study was twofold: To identify the assumptions that underlie college women's HPV vaccine decisions and to increase understanding about the meanings that college women ascribe to the HPV vaccine messages they receive from family, peer, and health care providers.

The assumptions underlying college women's HPV vaccine attitudes (research question 1) are discussed in the following section as falling under HPV vaccine acceptance or resistance. Furthermore, the family, peer, and health care provider messages that college women describe (research question 2) are discussed by first describing the family, peer, and provider messages that support HPV vaccination followed by describing the family, peer, and provider messages that reflect resistance toward HPV vaccination. Results on research question 3, which seeks to understand college women's HPV susceptibility perceptions are reported last.

Vaccine Decision Narratives

The following section describes the assumptions underlying college women's decision to accept the HPV vaccine followed by the assumptions underlying college women's decision to resist the vaccine. Narratives of HPV vaccine acceptance were defined as: explicit mention of HPV vaccine intent, having already been vaccinated, explicit statements that vaccination made sense and was worthwhile, and acknowledgement that if the doctor recommended vaccination the participant would likely vaccinate (i.e., indicating intention).

Decision Narratives on Vaccine Acceptance

Most of the women began their narratives from similar perspectives—articulating that HPV vaccination was commonsense and a worthwhile prevention measure. A majority of women who were interviewed (81%, 29/36) were accepting of HPV vaccination. Even among the responses of those women who had not been vaccinated, a majority (73%, 16/22) expressed attitudes accepting of HPV vaccination. Thus, within this sample, it appears that messages about the HPV vaccine have created a positive overall impression.

When analyzing the acceptance narratives in more detail, assumptions underlying the decision themes that emerged included: (a) supportive family messages, (b) explicit health care provider endorsement, (c) descriptive peer norms normalizing vaccination, and (d) cancer prevention shaping the perceived benefits of HPV vaccination (i.e., disease framing). In what follows, these salient decision themes are described in greater detail.

Supportive Family Messages—a Form of Self-Efficacy. Supportive family messages were a salient theme in narratives of vaccine acceptance. Family support was expressed in various ways, including financial support (e.g., “My grandfather actually offered to pay for the vaccine”); parents making the appointment (e.g., “My mom wanted me to get it, and she made the appointment”); parental messages conveying that vaccination was a good idea, i.e., positive injunctive norms, (e.g., “I talked with my dad about it [HPV vaccination]...he thought it was a good idea I get it”); and by parents sending their daughters vaccine information, (e.g., “my mom sent me an article on HPV vaccination saying I should check it out.”). These family messages explicitly reinforced the importance and validity of HPV vaccination and in some cases were instrumental to actual vaccination.

Among the vaccinated, parental messages were reported as the impetus to actual vaccination. A college woman who had been asked to describe what led her to vaccinate replied

that the main reason she vaccinated was because of her parents' support: "It's been easy for my roommates and I to set up getting the HPV vaccine because our parents are behind it." College women also attributed their vaccine decisions to having open lines of communication with their parents on topics such as sex (e.g., "most of the information we get is from our moms and parents and she [a roommate] wouldn't be ok with talking about sex with her parents.").

Sibling messages (i.e., descriptive norms) were also reported as an impetus to vaccinate (e.g., "because my sister got it...that reinforced that I should get it," "that my sister got it and she's ok influenced me the most", "I got it with my two sisters."). In addition to family messages, explicit health care provider messages also emerged as important for moving women who had plans to vaccinate to actually vaccinate.

Explicit Provider Endorsement. Participants' decision narratives that indicated vaccine acceptance included "talk" with health care providers who explicitly encouraged and recommended HPV vaccination. Examples included: "When my doctor pushed the vaccine it made me realize it was important," He said "you really need to get this," He reinforced the importance of getting it [the HPV vaccine]," "The most influential impact for me was my family doctor who really pushed it...The commercial did something...Hey there's a vaccine out there but the doctor, he's intelligent and I thought he's really pushing this," and, "When my doctor recommends it, then I'll get vaccinated."

These messages were influential because health care professionals were perceived as being trustworthy and the most knowledgeable. Some college women reported their vaccine decision being most influenced by the opinions and recommendations of a medical expert and that they wouldn't trust or listen to family messages about the HPV vaccine. One informant recalled, "the doctor influenced me the most...they have the most information and you respect

their decisions.” A second described it this way, “If the doctor told me I would be more likely to listen,” while a third said, “I haven’t taken the steps to do it yet but if my doctor recommends it as a female in her 20s it would be a good thing to do...,” and a fourth woman recalled that, “If the vaccine is recommended by a doctor it could put more trust in the vaccine.” Interestingly, in one case it was not the explicit message from the doctor but rather the implicit reinforcement of the doctor’s message that the doctor was having her own daughter vaccinated. The informant reported that when her physician told her this, it made an indelible impression: “My gynecologist told me about it [the HPV vaccine]. The one thing I remember her saying was that she was going to have her daughter do it. That was really compelling.”

Descriptive Peer Norms Normalizing Vaccination. College women reported that they typically did not talk with their peers about HPV vaccination and if they did, it was only to ask whether the shot hurt. These women said that peer messages on HPV vaccine attitudes and behaviors had little influence on their attitudes and decisions. However, this perception must be tempered by the fact that women who had been vaccinated or favored vaccination reported that their friends had been vaccinated while the contrary held for college women who were skeptical of vaccination.

College women whose decision narratives reflected vaccine acceptance reported having peers who had been vaccinated, saying things such as, “All my nursing friends have had the vaccine,” “All of my friends have gotten the vaccine,” “My core group of girlfriends have all gotten it,” “My friends have gotten it. It seems pretty normal to me. Routine,” “All 3 girls in my dorm room—they’ve all gotten the vaccine,” and, “I’m in a sorority but everyone’s gotten it even though it hurts.” Knowing that many similar peers had vaccinated appeared to normalize HPV vaccination. These descriptive peer norms stand in contrast to narratives about vaccine resistance

in which peer messages included “None of my friends have gotten it.” It may be that these peer message were “leaked” or indirectly communicated, establishing a descriptive norm supporting vaccine attitudes that reflected the “becoming friends with similar others” phenomenon.

Disease Framing Shaped Vaccine Benefit Perceptions. Motivation to vaccinate was framed by the desire for protection against cervical cancer with little to no mention of protection against HPV. The following quote illustrates how decision narratives framed the vaccine by its indirect protection against cervical cancer and not by its direct protection against HPV: “Any way to prevent cancer is a good reason for me to get vaccinated, ” “If I can prevent cancer I’ll do whatever it takes,” “I don’t want cervical cancer,” or “When I heard what the shot can help prevent—cervical cancer—I wanted to get it.” Thus, the vaccine was described as a cancer vaccine and not as an HPV or genital warts protection vaccine for these women. Cancer prevention set the tone and justification for vaccinating.

Despite favorable attitudes toward vaccination, a substantial number of college women have not vaccinated. Vaccine resistance was defined as including: explicit skepticism about HPV vaccination, explicit messages of non-intention to vaccinate, explicit messages that the vaccine was not necessary for prevention, explicit messages that the vaccine was appropriate for only certain individuals (e.g., those who are promiscuous), or explicit messages about any type of barrier preventing vaccination (e.g., cost, lack of insurance, or parental disapproval). Themes of vaccine resistance are reported next.

Decision Narratives on Vaccine Resistance

Few women (19%, 7/36) were vaccine-resistant and even one of these women reported receiving the first shot as a result of reported pressure at the doctor’s office. As one would expect, most of the resistance was among those not vaccinated, with 27% (6/22) of the

unvaccinated women reporting resistance. These vaccine resistance narratives reflected (a) skepticism regarding vaccine safety, (b) the attitude that alternative prevention strategies were sufficient, (c) stigmatizing messages, (d) overcoming self-efficacy barriers (e.g., cost, availability, time, fear of parental disclosure), and (e) delay strategies.

Skepticism Regarding Vaccine Safety. The dominant story that emerged in resistance narratives was concern about vaccine safety. This perception was based primarily in the vaccine's newness. Resistance narratives opened with the vaccine's newness casting doubt on claims about its safety. Illustrative statements included: "There's not too much history, statistics, evidence of side effects or anything. It's new," "I was against the vaccine because it was so new. A lot of times they come up with new vaccines and drugs and then ten years down the line they find out terrible things they cause," "something could turn up down the road," "side effects might only become apparent later, it's too new to know yet" "I wasn't thinking of getting it because it's brand new. I wanted to see if there were any side effects." These messages conveyed reluctance of vaccine safety because it was so new: "There haven't been any long term studies done. That's the part where everyone's getting nervous about it."

Metaphors were even invoked in relation to avoiding a new vaccine: "They say never buy a new car when it first comes out because you don't know the issues that come along with it. That's why I don't want to get the vaccine." These vaccine safety concerns were legitimized by citing previous occurrences in which medications had been released to the public, initially touted as wonder drugs, and then pulled off the market at a later time due to adverse side effects. Some resistance narratives referenced the suggestion that the vaccine could affect reproductive health, in particular fertility: "you don't know how it could affect pregnancies in the future," "Let's wait until people have kids and there's not some crazy thing happening." This was particularly ironic

given the fact that serious HPV infection (in the unvaccinated) can lead to what is medically termed an incompetent cervix (in which the cervix muscle is weakened from HPV), which can lead to an increased risk for premature birth (Sjoborg & Esild, 2009). In these narratives, the vaccine was perceived of as risky and subsequently rejected. These same resistance narratives invoked alternative prevention strategies in lieu of vaccination.

Invoking Alternative Prevention Strategies. Some of the vaccine-resistant women who talked about vaccine safety concerns invoked alternative prevention strategies. This stance allowed them to maintain their position as supportive of prevention but deny vaccination as the necessary step in achieving prevention. This perception emerged in daughter-parent communication: “My mother said to just not be stupid about sex. ...I’m not an idiot about who I sleep with. I really feel like HPV only affects people who don’t make smart decisions. If there are condoms out there today use a condom....I feel like there are other ways to prevent HPV....less serious ways than getting the vaccine.” Several women’s narratives echoed the idea that using condoms was perceived as a sufficient prevention measure against HPV: “I feel like condoms will protect me,” “I think if you take precautions...I don’t think it’s necessary to get the HPV vaccine.” Messages that only reckless women are at risk for HPV while unintended stigmatized women’s sexual behavior.

Stigmatizing Messages. A salient story among resistance narratives was that if you are in a committed relationship and you are “smart about sex” (i.e., use protection), the HPV vaccine is not necessary. In their decision narratives, college women disclosed their belief that only women who were promiscuous, careless, or not smart about sex were at risk for HPV. This was a recurring theme. Examples included: “It means you weren’t smart about who you were sleeping with”, “the stereotype that only sluts get HPV”, “at some point someone had poor judgment”,

“people who have STDs are careless and dirty,” and “I feel like for college students its socially scary to have HPV.” These stigmatizing peer messages were reinforced by reports of parental messages: “My dad said if you have one partner and you’re in a committed relationship and you know you’re telling the truth all the time then it’s not necessary to get the HPV vaccine”. Along similar lines, a college women reported her mother as saying, “If you’re not stupid about sex you don’t need the vaccine.” College women interpreted these messages as meaning that only individuals who were reckless in their sexual behavior needed the HPV vaccine. These stigmatizing messages were a recurring theme in peer messages among vaccine resistance narratives: “I know some individuals...I know their lifestyle and I think they should get vaccinated,” and “I guess if women have multiple partners they should consider the vaccine.”

Finally, according to this narrative, once a woman was sexually active, it was too late to benefit from vaccination. College women believed and in some cases, their doctors told them, that it was too late to benefit from the vaccine because of their age and because they were already sexually active. In addition to this false belief that “it is too late”, there were several barriers to vaccination.

Overcoming Self-Efficacy Barriers. While some college women’s attitudes were supportive of HPV vaccination, they described several barriers to getting vaccinated. These barriers included: vaccine cost, lack of time, unawareness that the vaccine was available on campus, and for some, fear of having to discuss vaccination (and sex) with their parents.

Vaccine cost was a serious obstacle for many women. “I think it’s [vaccination] a good idea. It’s just expensive for a lot of people,” “I wanted to get it but it was expensive...my insurance didn’t cover it at the time,” “Cost is an issue, it depends on how much I would have to pay, I have tuition and car payments to pay,” “If it had been less expensive I would have gotten it

right away,” “I think I would be vaccinated by now except that it costs \$160 per shot here at UHS.”

Most women were unaware that the HPV vaccine was available on campus: “I know my friend wanted to get it but she thought she would have to go home which is kind of far. It was kind of a hassle.” They also commented on their busy lives as well as moving around a lot as preventing them from getting vaccinated: “I would have gotten it...it’s just that getting three shots across nine months is a hassle, and I’ve been moving around a lot in the last couple of years,” “I’d get it if I had the time. I work, I take classes.” These messages showed that vaccine intention was there for many, but that practical, logistical barriers needed to be overcome to actually vaccinate. For some women however, fear of discussing vaccination (and inevitably sex) with parents was the primary barrier to vaccinate.

Several narratives referred to college women as being too afraid to talk to their parents about the HPV vaccine. They were afraid that bills related to vaccination would be sent home only to result in parents questioning their daughters about their sexual activity. Examples included: “My dad if he found out that I was going to get it...he’d ask, Is she having sex now?”, “I told my friend, she doesn’t have to tell her mom,” and “I’m not sure college women will necessarily talk to their moms. I have a friend...She’s too afraid to talk to her mom about it [vaccination].” Thus, this form of low self-efficacy was a family communication barrier to vaccination. In response, some women invoked a delay strategy, electing to avoid a vaccination decision altogether.

Delay Strategy. Some women simply avoided a vaccination decision by delaying it. One woman denied being at risk for HPV and responded, “Since you can vaccinate up to age 26, I have five more years to consider it.”

In summary, decision narratives on vaccination resistance reflected: (a) concerns about vaccine safety, (b) beliefs in the sufficiency of alternative prevention strategies, (c) stigmatizing messages about women who acquire HPV, (d) overcoming self-efficacy barriers (cost, time, availability, fear of parental disclosure), and, (e) delay strategies.

A summary of decision narratives reflecting vaccine acceptance highlighted: (a) the importance of supportive family messages in vaccination adoption, (c) the role of explicit doctor messages endorsing vaccination, (c) descriptive peer norms normalizing vaccination, and (d) disease framing (cancer) shaping vaccine benefit perceptions. Common across all decision narratives was the perception that personal HPV vulnerability was understood by relationship status. This relates to answering research question 3: What is college women's understanding of HPV susceptibility? This is answered in the section that follows.

Relationship Status Frames College Women's HPV Susceptibility Perceptions

College women perceived HPV susceptibility primarily by their relationship status. When asked about HPV susceptibility, college women's responses were framed by messages about: (a) monogamy, (b) promiscuity, (c) not being currently sexually active, or (d) being married. In other words, risk perception was viewed by sexual activity status and more specifically, by relationship status (i.e., those who were sexually active but in a committed relationship did not see themselves at risk). Responses reflected the false belief in many cases that monogamy was protective: "I don't feel personally vulnerable because I am in a committed relationship where we are only seeing each other," "I'm not sexually active with many partners. I've only been sexually active with one person my entire life. From my understanding, it's the people who have sex with multiple partners that get it [HPV]," "I haven't thought I needed to get it because I've been with my boyfriend and I haven't had any problems...but I'm sure it's completely different

for my girlfriends who engage in a decent amount of sexual activity with a lot of different people,” and “I’m in a monogamous relationship so I don’t need the HPV vaccine.” These were typical and common responses. Other messages showed that vaccination was only considered when events occurred such as breaking up, which then prompted consideration of the vaccine: “I wasn’t going to get it but I broke up with my boyfriend. That’s when I had my first shot.”

As illustrated by these messages, women acknowledged the potential for HPV vulnerability due to having multiple partners or after breaking up with their partner. Participants never acknowledged the possibility of serial monogamy as a transmission mode. Married women saw no need to be vaccinated and for them vaccination was interpreted as a signal of mistrust of their partners. A relational understanding of HPV susceptibility cut across narratives of vaccine acceptance and resistance.

Discussion

The goal of this study was to characterize the meanings that college-aged women ascribe to family, health care provider, and peer HPV vaccine messages and how college women’s interpretation of these messages impacts their HPV vaccine decision-making. Collecting *narratives* provided insight into how college women go about vaccine decision-making. Many college women were norm-oriented in their decision styles, basing decisions on the attitudes of family and health care provider messages while having only superficial HPV knowledge.

Family Messages Matter

Decision narratives revealed that college women rely on family messages to make HPV vaccine decisions despite their age and being away from home. While these findings echo those reported in the vaccine literature for 9-12 year olds—that parental vaccine attitude play a key role in determining vaccine adoption (Constantine & Jerman, 2007; Ogilvie et al., 2007) they are

somewhat surprising given previous research reporting that college women talk about sex-related topics with close friends at college more than with mothers (Lefkowitz & Espinosa-Hernandez, 2007). Discussion around HPV vaccine adoption appears to fall under the purview of family or health talk, which may be explained by prior vaccination decisions made with family rather than friends. In addition, the high cost of vaccination may cause college women to turn to parents for financial support, necessitating a health discussion.

Clinician Messages Make a Difference.

Whether women had recently seen a clinician seemed to matter and second, whether the clinician explicitly recommended HPV vaccination appeared important in moving college women to actually vaccinate. The importance of health care providers explicitly recommending the HPV vaccine has been discussed in the prevention literature as a critical programmatic consideration (Caskey, Lindau, & Alexander, 2009). Some clinicians appear to not discuss the HPV vaccine because of cost and time concerns (Keating et al., 2008; Zimet et al., 2008). This issue is of concern and should be examined in more depth in future research efforts. Ensuring that young adult women visit health care providers before they attend college and integrating HPV vaccine recommendation during these visits in clinical practice has yet to become routine (Rodewald & Orenstein, 2009). College women reported in some cases either that their health care provider did not raise the issue of HPV vaccination at all during clinic visits or said that the HPV vaccine was not necessary or that it was too late. These types of health care provider messages led to vaccination inhibition among participants in the current study.

The importance of health care providers actively supporting HPV vaccination cannot be understated. Health care providers play an important role in public health efforts promoting HPV vaccination by explicitly recommending the vaccine. Not explicitly recommend the HPV vaccine

significantly undermines prevention efforts. Recent reports in the literature align with some narrative experiences in the current study's sample in which college women report physicians simply not mentioning the HPV vaccine or down playing it.

Overcoming Self-Efficacy Barriers

Although a majority of participants expressed favorable HVP vaccine attitudes, there remain logistical and family communication barriers as major deterrents to HPV vaccination. While logistical barriers are common to vaccination (Chapman & Coups, 1999; Telford & Rogers, 2003) family communication barriers (i.e., fear of having to discuss sex with parents as a consequence of vaccinating) present as a social barrier unique to HPV vaccination. Self-efficacy barriers related to HPV vaccination are thus more complex.

The family communication barriers differ qualitatively in college women compared to those reported among 9-12 years olds. With adolescent vaccination, the focus of family communication has been on parents and their fears that vaccination will promote promiscuity (Kahn et al., 2008). With college women, family communication barriers arise around college-aged women's reluctance to discuss the HPV vaccination with their parents in some cases. Family communication in addition to logistical barriers pose significant challenges to increasing HPV vaccine adoption among college women.

Peer Messages, Stigma, and Perceptions of HPV Susceptibility

Peer messages were stigmatizing with respect to beliefs about who was vulnerable to acquiring HPV. In part, this stemmed from perceptions that HPV susceptibility was understood by relationship status, with those reporting involvement in a monogamous relationship or no relationship as unlikely to be vulnerable to HPV. While those who are sexually inactive may not be at immediate risk for HPV, individuals in monogamous relationships are at risk for acquiring

HPV. Serial monogamy is considered to be an important mechanism of HPV transmission (Burchell, Winder, de Sanjose, & Franco, 2006). Among college-aged women HPV susceptibility appeared to be reserved for the promiscuous and those with poor judgment, which is a myth that needs to be corrected.

Cancer Prevention as the Dominant Vaccine Narrative

Decision narratives revealed the power of disease framing. The benefits of HPV vaccination were primarily framed as worthwhile because of cancer prevention with HPV absent from discussions. On the one hand, this framing choice is well justified given that the investment in developing a cancer vaccine is worthwhile while investing in a genital warts vaccine (a non-fatal condition) is not. On the other hand, *cancer* messages used to introduce an *HPV* vaccine have the potential to mislead the public. The first and foremost prevention goal of the HPV vaccine is the prevention of HPV not cancer. The only concrete evidence to date is that the HPV vaccine has reduced HPV related morbidity (Smith, Melendy, Rana, & Pimenta, 2008). Whether HPV vaccination will reduce cervical cancer mortality has yet to be shown. As a result it is premature to promote the vaccine as cancer prevention.

College Women's Decision-Making

Culture-centric narrative theory guided the development of interview protocols asking college women to explain how they go about their decision to vaccinate. Collecting decision narratives (i.e., narrative knowing) was critical for gaining insight into women's experiences and how these experiences shape their decisions (Hecht & Krieger, 2006; Larkey & Hecht, 2009). While people may not be able to explain why they behave in a certain way, they can help us understand their interpretation of events and their reasoning process. Responses indicated that family and health care provider messages provide vaccine decision-relevant knowledge for

college women. Contrary to predictors of HPV vaccine acceptability reported in the literature (Brewer & Fazekas, 2007), perceived severity of HPV and perceived efficacy of the vaccine did not emerge in women's narratives as relevant to HPV vaccine decisions.

Focus theory of norms provided the groundwork for understanding how college women's decision-making was norm- and reactive-oriented, yet rarely deliberative (invoking personal norms). College women's decision narratives appeared to be shaped primarily by the injunctive norms of parent and health care providers (whether parents and health care providers thought the HPV vaccine was a good idea). Other college women displayed a reactive decision style based on descriptive norms (whether peers' experiences with getting the shot were positive or negative). These women's decision narratives reflected decision-making in response to one of several experiences: learning of a friend or roommate diagnosed with HPV or having a sibling vaccinate or be diagnosed with HPV. Finally, few college women's decision narratives were reflective of personal norms driving their decisions.

In summary, collecting narratives with a focus on norms provided insight into college women's decision-making. Almost all women were exposed to *multiple* HPV vaccine messages and these messages either reinforced or undermined the validity of HPV vaccination.

Cultural Narratives about Vaccine Mistrust

Narrative accounts about HPV vaccine decision-making shaped and reflected broader cultural narratives about vaccine mistrust. Vaccine campaigns need to include messages that reassure the public of vaccine safety and that vaccination is necessary while minimizing perceptions of vaccine risk. Vaccination is still perceived by many as a considerable risk that is not worth taking.

Study Limitations

One limitation of this study was that the student sample was not ethnically diverse. Future research exploring cultural beliefs around HPV vaccination and tied to specific groups of at-risk women will be important to more effectively reach these sub-groups of women (e.g., Hispanic-, African-, Vietnamese-American, and Appalachian youth). Cervical cancer rates are highest in the United States among Hispanic women, followed by African-American, Vietnamese-American, and Appalachian women (NCI, 2007). Moreover, there is evidence that cervical cancer prevention messages for Mexican immigrant women were not relevant to their learning needs around HPV vaccination and as a result, miss an important opportunity to effectively communicate cervical cancer prevention messages (Hunter, 2005; Lofters, Glazier, Agha, Creatore, & Moineddin, 2007). Another study limitation included the lack of male representation. Men's attitudes about the HPV vaccine are equally important to understand as they are carriers of HPV and can also have symptoms. This is especially the case in light of the FDA recommending and encouraging the use of the Gardasil vaccine in men as of September 17th 2009 (Young, 2009). Framing of HPV vaccine messages aimed at reaching men will need to be re-considered. Cervical cancer prevention messages will not prompt men to vaccinate. Vaccine messages will need to be re-framed as prevention against HPV related to genital warts, head and neck, anal, and penile cancers. Or alternatively, guilt appeals (although ethically controversial) may effectively reach men motivating them to vaccinate to avoid being carriers and transmitters of HPV to their loved ones.

Implications for Designing HPV Vaccine Messages

Currently, there is no established health campaign strategy for communicating about the HPV vaccine with college-aged women (Sherris et al., 2006). This study provides insight into the messages that need to be incorporated into HPV vaccine campaigns to effectively reach college-

aged women. Communication strategies that address messages unique to college-aged women include dispelling myths that “It’s too late”, that “If you’re smart about sex you don’t need the HPV vaccine” or that “HPV only affects women who don’t make smart decisions about sex.” Effective communication is critical to maximizing adoption of the HPV vaccine, which is volitional. Communication strategies are needed that are developmentally, socially, and culturally appropriate for college-aged women.

Findings from the current study showed that despite being older college women turn to parents’ injunctive vaccine norms for guidance when making HPV vaccine decisions. This finding has also been found in a larger, state-wide study conducted in Minnesota (Caskey et al., 2009). Providing college women with communication strategies to discuss the HPV vaccine with their parents in less face-threatening ways and correcting misinformation should be priorities in HPV vaccine messages aimed at college-aged women. For example, when college women discuss the HPV vaccine with their parents, they can avoid vaccine messages being interpreted as a personal request to initiate sex by discussing the HPV vaccine as a universal recommendation for all women and men. These were important concepts that emerged as relevant to college-aged women. Such examples inform HPV vaccine message design relevant for this age group.

Several themes emerged as part of college women’s HPV vaccine decision narratives that have implications for designing prevention interventions and for health care practitioners communicating about the vaccine with college-aged women. Findings could be understood around four themes: (a) that relationship status frames college women’s thinking about whether the HPV vaccine is relevant to them personally, (b) that even among college women open to vaccination these women will likely only vaccinate if the vaccine is easily accessible, i.e., available to them on campus and they are aware of its availability, (c) that exploring family (i.e.,

parental) HPV vaccine norms may prove useful when practitioners talk about the HPV vaccine with college women , and (d) finally, dispelling erroneous myths will be necessary to prompt women to vaccinate.

Chapter Four

Considering the Contribution of Narrative Source to Exemplification Theory:

A Randomized Clinical Trial of an Intervention Promoting HPV Vaccination in College Women

Abstract

The present study reports on the first known randomized controlled trial testing an HPV vaccine intervention. A randomized clinical trial was conducted testing a narrative-based video intervention promoting HPV vaccination in college-aged women ($N=404$). The contribution of narrative source to exemplification theory (Zillmann, 1999) was considered. Narrative source (peer-only, health care provider-only, combined peer-and-provider) differences were investigated for their impact on perceptions of HPV vaccine self-efficacy, response-efficacy, intent, and uptake. Controlling for HPV knowledge, sexual activity, and HPV daughter-parent vaccine communication, the combined peer-and-provider narrative intervention significantly increased HPV vaccine self-efficacy, intent, and uptake compared to control conditions. The intervention showed no significant effects on response-efficacy and HPV susceptibility perceptions. To effectively reach college-aged women about HPV vaccination, combining peer and health care provider (i.e., expert) appeals appears to be the needed mix of exemplar source cues. Theoretical and practical implications of study findings are discussed.

*Considering the Contribution of Narrative Source to Exemplification Theory:
A Randomized Clinical Trial of an Intervention Promoting HPV Vaccination in College Women*

Illustrations are often used to clarify a message, especially when the audience is unfamiliar with the topic. This practice typifies not only informal talk, but also the design of more formal persuasive messages. As a result, Zillmann (1999) developed exemplification theory to explain how the use of illustrations or “exemplars” can be used to communicate the prevalence and severity of a social phenomenon. Exemplification theory draws on the assumption that individuals make inferences from the sampling of exemplars to which they are exposed and apply these inferences to shaping attitudes about social issues (Strange & Leung, 1999; Zillmann & Brosius, 2000). Furthermore, these inferences allow people to assess rapidly the relevancy of an issue and subsequently, to make a decision as to whether the message merits further scrutiny. Thus the inclusion of narratives in health messages conceptualized as a sampling of testimonials is a communication strategy that can be applied to effectively reach less involved audiences.

The present study builds on exemplification theory by considering the contribution of narrative source. In addition to considering source, the theory is applied to a new context, namely public health, to test whether exemplification impacts HPV vaccination uptake (i.e., health behavior change).

Exemplification Theory

As segments of pertinent experience that are stored in memory, exemplars provide samplings of information about past occurrences that foster dispositions and ultimately

direct behavior toward similar occurrences on later encounter. (Zillmann & Brosius, 2000, p.vii).

This quote highlights the main assumption of exemplification theory—that the formation and modification of beliefs about phenomena are based, at least in part, on exposure to samplings of experiences. These samplings or exemplars of experiences can function as surrogates for direct personal experiences.

In exemplification theory, personal experience exemplars are treated as a type of evidence form that is distinct from statistical evidence (Zillmann, 2002). Furthermore, exemplification theory is one of the few narrative theories that provides guidance on the inclusion of both narrative and statistical health messages. Each evidence form (statistical and exemplar) communicates about the prevalence of an issue but from different perspectives. The validity of statistical evidence resides in being representative of the population while the validity of exemplar evidence resides in representing lived, personal experiences (a type of social validity). The two evidence forms, exemplars and statistics, complement each other and when combined are hypothesized to increase persuasion compared to using either evidence form alone (Allen et al., 2000; Greene, Campo, & Banerjee, 2006; Slater, Buller, Waters, Archibeque, & LeBlanc, 2003). Beyond this main assumption, the theory specifies conditions under which samplings of exemplars differentially influence receiver perceptions of issues.

A number of studies provide convergent evidence in support of the underlying premise of exemplification theory that the inclusion of exemplars in addition to statistical messages can have a pronounced effect on attitudes (Zillmann, 2000). Earlier studies showed that the inclusion of exemplars in health risk messages offered a strategy to increase the relevance of a health issue (Iyengar, 1990; Zillmann, 2006). These earlier exemplification studies also demonstrated that

audiences are insensitive to sample size, and were influenced by the viewpoints of testimonials even though they represented a minority view that contradicted the statistics concurrently provided in the health message (Brosius & Bathelt, 1994; Zillmann, Perkins, & Sundar, 1992).

Later exemplification studies recognized the importance of eliciting emotion particularly empathy in audiences. These later studies focused on designing exemplars to elicit greater emotionality in audience responses and included strategies such as contrasting calm versus emotional voices in audio-delivered messages (Aust & Zillmann, 1996) and contrasting the severity of exemplar descriptions through verbal description or visual images (Gibson & Zillmann, 1994; Zillmann et al., 1996). These studies showed that exemplars imparted significant effects on judgments even when these exemplar views countered the statistical base-rate information included in the message. Thus, we can conclude from a review of exemplification studies that inclusion of exemplars in health risk news stories demonstrates persuasive effects on attitudes and judgments (i.e., attitudes aligned with the views portrayed by the exemplars).

These persuasive effects however, have been demonstrated primarily in media contexts in which participants were asked to read news stories followed by attitudinal questions concerning the news message (Zillmann, 2002). Exemplification theory has been criticized for its dependence on audience perceptions as outcomes rather than behavior change. Thus, the question that remains is whether the persuasive effects of exemplars extend to health campaigns designed to change health behaviors.

Testing Exemplification Theory's Impact on HPV Vaccine Behavior

Communication strategies that pass the litmus test of impacting behavior provide a more significant test of a theory. Furthermore, health behavior change will lead to improved health outcomes, which is more valued in public health than attitude change. For example, only

increased HPV vaccination (as opposed to change in HPV vaccine intent) is likely to result in decreased HPV morbidity (Rodewald & Orenstein, 2009). Therefore, in order to realize the HPV vaccine's potential and demonstrate improve public health, an intervention needs to show increased vaccine uptake. Communication theorists have long recognized the important role of source for behavior change (Kelman & Hovland, 1974; McGuire, 1985). This variable has received less attention in exemplification theory.

Considering Narrative Source Contributions to Exemplification Theory

Source has served as the building block for numerous communication theories. Indeed, the choice of a source for an influence attempt can be a crucial determinant of the success of a campaign. In the exemplification literature, source has been examined by varying perceived credibility with the use of citations (Gibson & Zillmann, 1993, 1998), by varying age (student versus retiree) (Brosius, 1999), and by varying expertise (student versus nurse) (Cantor et al., 1976). While these source effects were primarily tested in print formats, the studies showed that narrative effects varied significantly depending on source.

The communication impact of employing peer or expert source appeals remains unclear. A single study comparing peer and expert appeals found that peers perceived as experts significantly increased exemplar-consistent attitudes (Cantor et al., 1976). The peer stimulus in this study was flawed since the peer was a 39-year old atypical, older student. Study results were confounded by this operationalization and surprisingly, the effects of narrative source expertise were never resolved with any follow-up studies.

Peers as Source

A developmental and social norms perspective (Arnett, 2000; Christensen, Rothgerbert, Wood, & Matz, 2004) argue that employing peers to deliver HPV vaccine messages to college-

aged women will be more persuasive than employing adult medical experts. A developmental view positions peers as the most accepted and even perhaps the most credible source that college-aged populations are likely to listen to especially for imparting sexual health messages (Arnett, 2000). Equally, a social norms perspective emphasizes peer sources because it frames HPV vaccination as a socially determined behavior in which the norms of peers impart identity relevance thereby, influencing vaccine attitudes and behavior (Christensen et al., 2004). Studies in the norms literature show that the attitudes and behaviors of similar peers play an important part in initiating and reinforcing health-related behaviors (Elek, Miller-Day, & Hecht, 2006; Latkin, Forman, Knowlton, & Sherman, 2003). Furthermore, whether a preventive behavior was perceived of as typical (i.e., normative) motivated behavior change among peers (Albarracín et al., 2005; Sheeran & Orbell, 1999). Following the “wisdom of the majority” has also been termed the bandwagon heuristic (Sundar, 2007). That is, if the peer narratives in the HPV vaccine video endorse vaccinating, it follows that viewers (college women) should form favorable vaccine attitudes. Peers are thus a form of homophilic communication that is more accessible than experts.

Experts as Source

In contrast to developmental and social norm perspectives, source credibility theorists argue that expert sources impart greater influence under conditions of (a) high involvement, (b) when the health message advocates adopting a personal health action (Hovland, Janis, & Kelley, 1953; Petty & Cacioppo, 1981) or (c) when audiences are exposed to a mixed message environment about the topic such that there is uncertainty about the issue (Sundar, Xu, & Oeldorf-Hirsch, 2009). Based on a source credibility view, medical expert sources presumably result in more persuasive health messages. Increased trust in the medical expert because of their

specialized education is expected to result in greater behavior change despite the heterophilic communication (peer audience-expert message). College health studies have in fact, consistently shown that college women preferred receiving medical recommendations from experts (Cline & Engel, 1991; Haines, 1995; White, Park, Israel, & Cordero, 2009).

Widely recognized in the communication literature, perceived expertise exerts attitudinal influence under conditions of heuristic processing (Chaiken, Liberman, & Eagly, 1989). Given that the intervention in the present study is a video intervention, heuristic processing is likely the dominant cognitive processing mode. Video format has consistently demonstrated that peripheral cues operate predominantly in this medium (Reimer, Mata, & Stoecklin, 2004). Therefore, the expert heuristic cue may play a key role for less involved college women attending online HPV vaccine messages.

Combining Experts and Peers—Matching Source Expectations

Combining source types is hypothesized to be most persuasive for two reasons: matching of source expectations and recommendation consensus (reinforced messages). The first reason is based on the idea of matching source expectations (Sanfey & Hastie, 1998). Recognizing the complexity of health decisions, individuals incorporate multiple types of information into their decisions. Certain types of information however, are expected to come from certain types of sources. For instance, college women may expect personal, conversational stories from peers while they expect medical, vaccine safety information to be communicated by medical experts. Acknowledging that health messages address multiple aspects of a health decision, a source type's influence will depend on the type of health information being communicated. Matching source with health message type (having the medical expert talk about medically related vaccine

information while having peers talk about personal experiences) is expected to maximize persuasion.

The second reason why combining peer and expert sources is expected to maximize persuasion has to do with experts reinforcing peer messages (Wang, 2008). Recommendation consensus, especially when the message environment (e.g., the media) sends mixed messages, can have a powerful message impact. Under conditions of uncertainty or inconsistency (as is the case with the HPV vaccine), authority or expert messages can function to reinforce peer appeals, thereby providing a credibility boost. The combined source effect thus results in a more persuasive message than either source alone. Given the straightforward logic of combining sources, it was surprising to find in the source literature that few studies combined peer and expert sources (Wang, 2008). One study that combined peer and expert sources found recommendation consensus to significantly enhance consumers' attitudes and significantly increase behavioral intentions (Fagerlin, Wang, & Ubel, 2005).

Based on matching source expectations and consensus (reinforced messages), a combination of peer and expert sources is expected to exert the greatest effect on HPV vaccine intentions and behavior (vaccine uptake) among college women.

Main Hypotheses:

- H1. Participants receiving one of the three narrative-based interventions will show greater HPV vaccine intention than participants in the control groups.
 - H1a. The provider-peer intervention will have the strongest effect.
- H2. Participants receiving one of the three narrative-based interventions will show greater HPV vaccine uptake than participants in the control groups.
 - H2a. The provider-peer intervention will have the strongest effect.

H2b. The relationship between intervention and vaccine uptake is mediated by intent.

It is anticipated that the effects of narrative HPV vaccine messages are more complex than those represented in the main hypotheses. Bandura's social learning theory (1986) suggests that narratives, which include peer modeling are expected to positively impact self-efficacy and that efficacy will mediate the effects of intentions and behavior. Bandura's theory posits that behavior is a function of social learning and that behavior change occurs when the target audience is provided with reasons why they should adopt a behavior (Hecht, Corman, & Miller-Rassulo, 1993; White et al., 2009). The benefits of having peers deliver health messages include peers being more accessible (for peers), social trust being greater with peers, and peers' stories being perceived of as more personal (Mellanby, Rees, & Tripp, 2000). The benefits of including experts on the other hand, include authority figures lending credibility to the message.

As a result we can anticipate that peer and expert sources will differentially influence efficacy. The theory identifies two types of efficacy: self-efficacy and response-efficacy. Self-efficacy or the belief that one can perform a behavior is likely to be related to peer narratives because peers not only role model but offer a similar-age and social trust perspective that the audience of college women relate to (e.g., "I'm coming from the same place as you perspective."). On the other hand, expert messages are expected to impact response-efficacy because the professional medical experts are the perceived and credible experts about whether the vaccine is effective, safe, and recommended. Based on this reasoning, three additional meditational hypotheses were posed:

- H3. Participants receiving one of the two narrative-based interventions that include peers modeling HPV vaccination (peer-only and peer-and-provider intervention) will show greater self-efficacy than participants in control groups.
- H3a. Self-efficacy will mediate the relationship between vaccination intent and the intervention: Narrative \Rightarrow efficacy \Rightarrow intent \Rightarrow uptake
- H4. Participants receiving one of the two narrative-based interventions that include health care providers (provider-only and peer-and-provider) will show greater HPV vaccine response efficacy than participants in control groups.
- H5. Participants receiving one of the two narrative-based interventions that include peer narratives (peer-only and peer-and-provider) will show greater HPV susceptibility than those in the control groups.

Method

A randomized clinical trial was designed to test the study hypotheses examining whether a narrative-based versus a non-narrative-based video intervention impacted HPV vaccine intent and uptake as well as examining whether narrative source impacts behavior (i.e., HPV vaccine intent).

Study Design

A posttest randomized clinical trial was conducted in order to test the study's hypotheses 1-5. Participants were randomly assigned to one of three control and treatment groups. Three control conditions were included to rule out alternative explanations for effects pertaining to (a) the medium of the message (i.e., video format relaying the same message as the exemplar-based videos without using exemplars); and (b) the ecological or natural message environment in which college women would be exposed to the student health website HPV vaccine information

(<http://www.sa.psu.edu/uhs/pdf/HPVUHS.pdf>) as well as a third, no message control. After establishing that control group means were similar (see Table 4.1), the three control groups were collapsed for the purpose of parsimony in structural equation modeling. The three treatment conditions included (1) peer messages, (2) provider messages, and (3) both peer and provider messages. A pre-intervention survey was administered to all participants to collect socio-demographic, sexual activity, and HPV knowledge information (these variables served as covariates in the analyses). The posttest survey collected participants' evaluations of intervention messages. Two months following completion of the posttest, an email was sent to participants asking if they had received the HPV vaccine (collecting self-report behavior data).

Table 4.1

Mean HPV Vaccine Intent

Condition	Intent (SE)	N
Peer	2.92 (.83)	(100)
Peer & Provider	3.10 (.66)	(100)
Provider	2.74 (.88)	(50)
Video Control	2.73 (.85)	(50)
Website Control	2.80 (.77)	(50)
No Message Control	2.89 (.74)	(50)

Participants

A total of 404 college women participated in the study. Participant age ranged from 18 to 26 ($M = 21$, $SD = 1.87$). The largest proportion of women were juniors while the smallest proportion of women were first year students (see Table 4.2). The majority of participants were Caucasian, had health insurance coverage, and had heard of HPV and its link with cervical

cancer. Half of the participants were sexually active and slightly more than half had spoken with their parents about the HPV vaccine.

Table 4.2

Participant Demographics (N = 404)

Characteristics	
<hr/>	
Year in College	
Juniors	30% (122)
Seniors	24% (95)
Sophomores	19% (77)
Graduate students	16% (63)
First Years	11% (44)
Ethnicity	
Caucasian	72% (290)
Asian-American	11% (46)
African-American	10% (40)
Latino	5% (18)
Middle Eastern	.01% (4)
Native-American	.002% (1)
Health Insurance Coverage	
Yes	90% (365)
No	8% (32)
Didn't know	1% (4)
HPV Knowledge	
Have heard of HPV	92% (372)
Link between cervical cancer & HPV	97% (390)
Link between genital warts & HPV	62% (249)
Sexual Activity	
Active	50% (202)

Intercourse last 30 days	54% (220)
Daughter-parent HPV Vaccine Communication	53% (214)

The groups (i.e., treatment and control) were compared for pre-test socio-demographics, sexual activity, and HPV knowledge (see Table 4.3) to ensure that treatment and control groups did not significantly differ prior to the intervention. Analysis of variance compared groups by mean age: $\chi^2 = (3, 400) = .949, p = .417$, and by year in college: $\chi^2 = (12, 401) = 9.559, p = .655$. Chi square analyses were conducted to compare group differences across several variables including health insurance coverage: $\chi^2 = (6, 401) = 7.553, p = .273$; ethnicity: $\chi^2 = (15, 399) = 19.680, p = .185$; and place of residence (whether they grew up in rural, suburban or urban areas): $\chi^2 = (6, 401) = 19.680, p = .185$. See Table 4.3 for summary of group comparisons. There were no significant differences among groups.

Additionally, groups were compared across three covariates: HPV knowledge, sexual activity, and daughter-parent vaccine communication. Analysis of variance compared groups on mean HPV knowledge: $\chi^2 = (3, 404) = .288, p = .834$. Chi square analyses compared groups by daughter-parent vaccine communication (0=no daughter-parent vaccine communication, 1= daughter-parent vaccine communication): $\chi^2 = (3, 398) = 2.891, p = .409$ and by sexual activity (0=no sexual activity, 1= sexually active): $\chi^2 = (3, 404) = 1.217, p = .749$. There were no significant differences among groups for HPV knowledge, daughter-parent vaccine communication, and sexual activity.

Table 4.3

Summary Table on Demographics Comparing Treatment and Control Groups

	Tx1	Tx2	Tx3	Control
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Mean Age	21	21	21	21
Mean Year in College	Junior	Junior	Junior	Junior
Mean HPV Knowledge	7.64	7.36	7.50	7.40
Insurance Coverage	89% (88)	92% (92)	88% (44)	93% (141)
Caucasian	70% (68)	80% (80)	82% (40)	68% (102)
Suburban	61% (60)	65% (65)	68% (34)	55% (83)
Sexually Active	57% (58)	55% (55)	58% (29)	51% (78)
Parent HPV talk	54% (53)	61% (60)	48% (24)	51% (77)

Note. Tx1 = Peer-only Video; Tx2 = Peer-and-Provider Video; Tx3 = Provider-only Video
Within-group frequencies are reported.

Recruitment procedure

Female college students ($N = 404$) attending a large northeastern university who were between 18-26 years in age participated in the randomized controlled trial. One thousand students were randomly sampled from the University Health Service's database using a random number generator. Emails were sent to the students with an announcement about the study and a signup website if they were interested in participating and met eligibility criteria (<http://thepmlab.com/cgi-bin/signup/index.cgi>). After an initial response from 200 students, an additional email was sent producing an overall response rate of 32% ($n = 320$). Since this number was inadequate based on power calculations and additional recruiting efforts through the same channel were not likely to be fruitful, especially given the presence of a similar competing study, an additional 80 students were recruited from a convenience sample in a public speaking course required of all university students. Thus, the recruiting frame for both methods was representative of the university women. The total sample size from both methods was 404.

Chi square analysis and independent sample *t* tests were conducted to examine whether there were significant group differences between the randomly sampled ($n = 320$) and the convenience sampled ($n = 80$) population. There was no evidence that the two groups differed significantly across a number of variables including sexual activity: $\chi^2(2, 401) = 0.24, p = .89$, place of residence (having grown up rural, suburban, urban): $\chi^2(2, 401) = 2.54, p = .28$, liberal/conservative orientation: $\chi^2(6, 401) = 5.20, p = .518$, and mean HPV knowledge: $t(402) = 0.25, p = 0.80$. As a result, data from the two groups were combined in further analyses.

Survey Procedure

Experimental sessions were conducted in a student computer technology classroom on campus. Participants signed up for a 30-minute time slot using an online signup website <http://thepmlab.com/cgi-bin/signup/index.cgi>. Upon arrival at the computer laboratory, participants were greeted by the investigator and seated at a computer. Participants were briefed about the length and purpose of the study and then consented.

As part of the consenting process, participants read and signed two forms. The first form was in print format and represented an authorization form (i.e., HIPPA form) granting permission to be contacted through email two months after they completed the online study. Participants were informed that they would be asked whether or not they had received the HPV vaccine. The second informed consent was administered online immediately prior to the survey. Participants implicitly consented when they clicked the “I agree” button to start the study. This second, online consent informed participants of the benefits, purpose, risks, and length of the study. All participants completed both consents.

Once consented and assigned, participants were directed to the pre-intervention survey where they answered questions about HPV and the vaccine, their sexual activity, protective STI

behaviors, and parent communication about the HPV vaccine. Following the pre-intervention survey, participants were randomly assigned to either a treatment or control condition using a randomization script (embedded in the informed consent website using html and java script: peer-only video treatment, provider-only video treatment, peer-and-provider video treatment, video control, website control, or no message control). Following exposure to the video (or alternatively the website or nothing), participants completed a posttest survey asking questions pertaining to message evaluation.

Stimulus Materials

The three treatment conditions were operationalized through five videos (2 versions of peer-only, 2 versions of peer-and-provider, 1 version of provider-only) and developed based on formative research described in the previous chapter. Limited access to the providers precluded development of comparable reenactments needed for a second video and presents a limitation to the study that is discussed in the concluding section. Each video included both statistical messages and exemplars in four parts: (1) HPV susceptibility, (2) overcoming self-efficacy barriers, (3) overcoming perceived vaccine harms, and (4) cues to action. These four theoretical components were grounded in formative research identifying these components as important for HPV vaccine decision-making among college-aged women (Hopfer, 2009a). Culturally grounded theory guided formative research (Hecht & Krieger, 2006) through which these four theoretical components were identified as important constructs to include for college populations. The order of the components was designed based on principles established in health message design literature (Maibach & Parrott, 1995). The video therefore, opened with 2 peer exemplars establishing relevancy to the audience (susceptibility), followed by a re-enactment addressing self-efficacy barriers (availability, time, and cost), then addressed perceived vaccine

harms, and ended with cues to prompt vaccination adoption (see Appendices F-H for narrative scripts).

HPV Susceptibility. This video component addressed perceptions of HPV susceptibility. Each video opened with the same statistics about the prevalence of HPV framed to be relevant for college populations (e.g., in a classroom of 30 students, as many as 8 have HPV). This segment was followed by 2 exemplars each recounting experiences of knowing someone with HPV thereby, implicitly addressing HPV susceptibility (exemplars varied by condition). In the peer condition, college women told stories of having a close friend or sister acquire HPV, explaining that these women who acquired HPV were not promiscuous and had acquired HPV from their partners despite being in monogamous relationships. In the provider condition, the exemplars were University Health Services (UHS) health professionals (doctors and nurses) who explained that at UHS, they witnessed firsthand a lot of cervical disease from HPV. In the combined peer and provider condition, one exemplar was a peer and one a health care provider.

Overcoming Self-Efficacy Barriers. The second component of the video was designed to overcome self-efficacy barriers (availability, time, and cost) to HPV vaccine adoption. In all conditions, a text message appeared on screen informing the viewer that the HPV vaccine was available on campus at UHS and that a majority of health insurances covered the cost of the HPV vaccine. In the peer condition, a re-enactment followed depicting the UHS waiting room with college women talking to each other about the HPV vaccine. In the waiting room, discussions informed the viewer that the vaccine was available on campus, was covered for graduate students and for most undergraduate students, and that reminder emails were sent to college women to help them complete their 3-shot vaccine treatment. In the provider condition, the re-enactment was omitted, but the same text as the peer condition (a screen shot with text information) was

included informing viewers of the same information. Finally, in the peer plus provider condition, the same re-enactment and text were used as the peer-only condition.

Overcoming Perceived Vaccine Harms. The third component of the video attempted to address perceptions of harm from the HPV vaccine. All versions began with a screenshot of text stating that catch-up HPV vaccination was recommended for college-aged women (women ages 18-26) and that the Centers for Disease Control and Prevention approved the HPV vaccine as safe and effective. This portion of the video was followed by two direct-to-camera testimonials addressing vaccine safety. In the peer condition, two college-aged women provided testimonials addressing vaccine safety. The first college student testimonial explained that her doctor explicitly recommended the HPV vaccine to her and that she trusted her doctor's recommendation. A second student testimonial standing in a laboratory (e.g., test tubes and laboratory benches in the background) dressed in a white lab coat, explained that she was a science major and that her familiarity with the FDA approval process of drugs through her research experience led her to be confident in the safety of the HPV vaccine. In the health care provider video, a health care provider from UHS provided a direct-to-camera testimonial recommending the HPV vaccine. The second provider testimonial, also UHS staff, confirmed that what was known for certain about the HPV vaccine was that a number of women exposed to HPV and not vaccinated go on to develop cervical cancer. In the combined peer-provider condition one peer testimonial was included in which a college-aged women stated that she trusted the recommendation of her doctor. All three treatment conditions ended the video section with a text message stating that the HPV vaccine had been studied for nearly ten years.

Cues-to-Action. The final section of the video was designed to stimulate action. The peer version opened with a re-enactment of a dorm scene with two college women talking on their

dorm bed. A third woman walks into the dorm room 20 seconds into the video. This third roommate explains that she just returned from UHS where she was vaccinated for HPV. The three women discuss whether the shot hurt, that the vaccine is recommended for college-aged women, and that the HPV vaccine is nearly 100% effective in protecting against the four most common HPV types. In this conversation, one college woman explains to the other two women that “it’s not too late” to receive the benefits of the vaccine if a woman is already sexually active and that it is ideal to be vaccinated prior to initiating sexual activity. For the provider videos, a health care provider wearing a stethoscope, tells a story of having talked with her daughter, also a college student, and that her daughter decided to get vaccinated. In the provider-and-peer exemplar videos, the health care provider testimonial is added to the peer exemplar dorm room re-enactment (see Appendices F-H for narrative scripts).

Manipulation Checks

Manipulation checks were performed for exemplar source. Participants were asked whether they recognized the exemplars in the video as college-aged women (peers) for the peer only video and whether they recognized the health professionals (doctors, nurses) as medical experts in the provider-only and in the provider-and-peer videos.

Stimulus Length

While the peer and the peer-and-provider conditions were comparable in length as measured both in number of words and minutes of running time (see Table 4.4) the provider-only condition was considerably shorter than the other two treatments because it did not contain reenactments due to limited access to the providers and presents a limitation to the study.

Table 4.4

Stimulus Length Measured in Number of Words and Time

Condition	Words	Time (minutes)
Peer	521	3.46; 3.39
Peer & Provider	556	4.11; 4.15
Provider	210	1.25

Video Conditions as Fixed Effects

To address the fact that the video conditions reflected fixed effects, two versions of each video condition were produced varying actors (Jackson & Jacobs, 1983). There were thus, two videos of the peer-only treatment and of the peer-and-provider treatment. The provider only treatment only had one video version since it was not possible to create two versions. The actual nurses and doctors from the local university health center were used for the video.

Measures

Three covariates (HPV knowledge, sexual activity, and daughter-parent HPV vaccine communication) were measured to control for potential differences in the sample. The outcome variables for the study included vaccine intent, self-efficacy, response-efficacy, HPV susceptibility, and HPV vaccination uptake.

HPV Knowledge. An existing scale was used to measure HPV knowledge (Fazekas, Brewer, & Smith, 2007). The scale, which has been used in college populations, consisted of 10 true/false knowledge items, plus a composite scale on symptoms (8 items), consequences of untreated HPV (8 items), and risks for acquiring HPV (8 items). Clinical HPV vaccine experts assessed items for face validity. The HPV knowledge scale reliability in the previous college-aged population was acceptable ($\alpha = .66$). Presentation order of the knowledge items was randomized in the survey.

Sexual Activity & Condom Use. Sexual activity was assessed with two items: (1) whether the participant was currently sexual active and (2) frequency of sexual intercourse in the last 30 days. These sexual activity measures had been used in previous STI interventions in young adult women (Sales et al., 2008). Respondents marked whether or not they were currently sexually active and then asked to mark the frequency with which they had sexual intercourse in the last 30 days: *never, once, twice, three times, more than three times.*

Condom use was assessed with two items: (1) whether condoms were used during the last sexual intercourse episode and (2) how often condoms were used during sexual intercourse in the last 3 months (0 = *never* to 5 = *every time with every partner*) taken from (Kahn et al., 2008).

Daughter-Parent HPV Vaccine Communication. A single item was used to measure whether college women had talked with their mother about HPV vaccination (Hopfer, 2009b). Participants responded with a *no* = 1 or *yes* = 2 to the statement “My mother and I have talked about HPV vaccination.”

HPV Vaccination Intent. Participants responded to a 2-item HPV vaccination intent scale (Fazekas et al., 2007). Scale format consisted of a 4-point response scale ranging from 1 = *definitely won't* to 4 = *definitely will* with higher scores indicating greater intent to vaccinate. Items included: “I intend to get vaccinated for HPV” and “If the HPV vaccine were completely free, how likely would you be to get the HPV vaccine in the next year?” ($M = 6.04$, $SD = 1.60$, $\alpha = .82$)

HPV Vaccine Self-Efficacy. Two items measured HPV vaccine self-efficacy scale taken from a previous study (Kahn et al., 2008). The two items included measuring confidence in the ability to vaccinate for all 3 shots (How confident are you that you could get vaccinated completely against HPV; that is get all 3 shots?) and measuring time (How confident are you that

you could find time to go to UHS for 3 visits to get vaccinated against HPV?) Response format was a 7-point scale with responses ranging from 1 = *not at all confident* to 7 = *completely confident*. Higher values indicated increased self-efficacy perceptions. ($M = 10.95$, $SD = 2.86$, $\alpha = .70$)

HPV Vaccine Response-Efficacy. Three items measured response efficacy in the present sample (McRee, Brewer, Smith, Reiter, & Gottlieb, 2009). The three items included “How confident are you that the HPV vaccine is effective?” “How confident are you that the HPV vaccine offers protection against cervical cancer?” and “How confident are you that the HPV vaccine protects against HPV related infection?” Response format was a 7-item response ranging from 1=*not at all confident* to 7 = *completely confident*. Higher values indicated increased response-efficacy attitudes ($M = 15.73$, $SD = 3.72$, $\alpha = .92$).

Perceived HPV Susceptibility. Two items measured HPV susceptibility taken from a previous study (Kahn et al., 2008). The item response format included percentage response spanning quartiles (e.g., 0%, 25%, 50%, 75%, 100%). Item content included: “The likelihood of me contracting HPV at some point during college or graduate school (whichever is applicable) is....” and “As a young adult the chance of me acquiring HPV is...”. Higher values indicated increased HPV susceptibility perception ($M = 4.77$, $SD = 1.78$, $\alpha = .83$).

Self-report HPV Vaccination (Uptake) was obtained as a binary outcome (yes/no) collected two-months after exposure to the video intervention and completion of the first posttest survey. At the two month time period, a follow-up email was sent to participants asking whether they had received the HPV vaccine shot. Participants replied with yes or no.

The measurement model in the results section provides details on the convergent and divergent validity of all measures.

Data Analysis

Data were entered and analyzed using SPSS 16.0. Analysis of variance tested baseline equivalence of means across groups for vaccine intent, perceptions of self-efficacy, response-efficacy, and HPV susceptibility. A series of confirmatory factor analyses were performed to examine the factor structure of the scales used in the current study and as evidence of convergent and discriminate validity. *Mplus* version 5.21 was used to conduct the confirmatory factor analysis, full CFA measurement models, and structural equation modeling (Muthen & Muthen, 2007). Model fit was considered good when RMSEA \leq .06 and CFI \geq .95 (Hu & Bentler, 1999).

Missing Data. During data screening, it was confirmed that no greater than 2% of data on each variable were missing. For SEM analyses, full information maximum likelihood (FIML) was used to handle missing data (Graham, 2009). For computing composite scales and their reliabilities, listwise deletion was used to handle missing data.

Dummy Coding. The exogenous variables (the 3 video interventions) were dummy coded to compare treatment with controls (the 3 control groups were collapsed into one control): Treatment 1 versus Control, Treatment 2 versus Control, and Treatment 3 versus Control (see Table 4.5).

Table 4.5

Dummy Coding for Three Narrative-based Video Interventions

Group	Tx1	Tx2	Tx3
Treatment1 (Peer Only)	1	0	0
Treatment2 (Peer + Provider)	0	1	0
Treatment3 (Provider only)	0	0	1
Control Conditions	0	0	0

Results

The results are presented in three parts. The first section presents manipulation checks of the stimulus and reports on within treatment mean differences to justify collapsing groups exposed to the 2 versions of the peer-only video (treatment 1) and collapsing groups exposed to the 2 versions of the peer-and-provider video (treatment 2). Next, a CFA measurement model is reported to verify the discriminant and convergent validity of the measures used in the model. Finally, substantive analyses are reported on the structural equation modeling that tested the study hypotheses.

Manipulation Checks for Video Intervention

Two manipulation checks were performed to ensure that variation in the variable of interest—source within narrative-based health messages—was recognized by the research participants. Participants were first asked whether they recognized the presence of medical health professionals (e.g., doctors, nurses) in the video they watched. Three groups were compared in this manipulation check: those exposed to the peer-only video ($n = 100$), those exposed to the peer-and-provider video ($n = 100$), and those exposed to the provider-only video ($n = 50$). Every participant who watched the provider-and peer video (i.e., 100%) responded “yes” to the manipulation check question asking about the presence of medical professionals in the video as did 96% of participants who watched the provider-only video condition. In contrast, only 15% of participants who watched the peer-only video condition responded “yes” to this question. A significant chi square value, $\chi^2(4, 250) = 184, p < .000$ indicated that as predicted, when asked whether there were medical health professionals in the video, participants exposed to the peer-only condition were significantly more likely to respond with “no” than participants exposed to

the peer-and-medical health care provider conditions or to the medical health care providers-only condition.

A second manipulation check asked participants to recognize whether peers were present in the video they watched by asking them “Were there college-aged women in the video you watched?” When asked whether there were college-aged women in the video they viewed, 98% of the participants exposed to the peer-only condition responded with “yes”, 100% of the participants exposed to the peer and provider condition responded with “yes”, and only 12% of the participants exposed to the health care provider-only video responded with “yes”. The significant chi square $\chi^2(4, 250) = 217, p < .000$, indicated that participants exposed to the peer conditions (i.e., the peer-only and the peer-and-provider condition) were significantly more likely to recognize peers in the video than the provider-only condition. These analyses indicate that the peer-provider manipulation was successful.

Collapsing Same Exposure Treatment Groups—Addressing Intervention as Fixed Effect

Independent sample *t* tests between peer versions 1 and 2 and between peer-and-provider versions 1 and 2 were performed to test for significant differences in vaccination intentions and efficacy. Results showed no significant differences within treatment versions—for the peer-only video $t(99) = -1.018, p = .31$ and for the peer-and-provider video $t(99) = -6.91, p = .50$ on vaccination intent. For efficacy there were also no significant differences within treatment groups—peer-only video $t(95), p = .54$ and for the peer-and-provider video $t(98) = .18, p = .86$. Therefore, the two versions for each treatment condition were collapsed for purposes of structural equation and mediation analyses.

Preliminary Analyses—The CFA Measurement Model

The confirmatory factor measurement model included four latent factors—HPV vaccination intent, self-efficacy, response-efficacy, and HPV susceptibility, and three covariates (HPV knowledge, sexual activity, and daughter-mother HPV talk) since these were included in the structural equation model. Correlations among the latent constructs were all significantly different from each other supporting their discriminant validity (see Table 4.6).

Inspection of the four latent factors—intent, self-efficacy, response-efficacy, and HPV susceptibility in the full CFA measurement model showed that the items intended to correlate with each other were greater than .70 and correlated with other variables less than .50. The two vaccine intent items were highly correlated with each other ($r = .71$) while weakly correlated with other variables ($r < .45$). The same held true for response-efficacy ($r = .85, .74, .77$), and for HPV susceptibility ($r = .71$). Self-efficacy items correlated only moderately ($r = .53$). The scale however, still demonstrated discriminant validity by correlating with other variable items to a less extent. After item inspection of each of the scales, interfactor scale correlations were also examined and demonstrated moderately strong correlations among factors (see Table 4.7).

The fit indices for the full CFA measurement model indicated a good model fit of the four latent factors with $RMSEA \leq .06$ and $CFI \geq .95$ (Hu & Bentler, 1999) (see Table 4.8). A Satorra Bentler chi square ($SB-\chi^2$) was used to correct for non-normality demonstrated in some of the scales. χ^2/df should be less than 3 indicating a good fit (Carmin & McIver, 1981).

Table 4.6

Inter-item Correlations of the Full CFA Measurement Model

Items	1	2	3	4	5	6	7	8	9	10	11	12
1. Intent1	1.00											
2. Intent2	.71	1.00										
3. S-Efficacy1	.43	.48	1.00									
4. S-Efficacy2	.14	.15	.53	1.00								
5. R-Efficacy1	.50	.47	.49	.27	1.00							
6. R-Efficacy2	.45	.45	.50	.28	.85	1.00						
7. R-Efficacy3	.38	.38	.45	.27	.74	.77	1.00					
8. Susc1	.22	.23	.14	.05	.12	.10	.15	1.00				
9. Susc2	.17	.22	.10	.03	.07	.05	.12	.71	1.00			
10. HPV Knowledge	.03	.01	.08	.02	.05	.06	.12	.20	.18	1.00		
11. HPVtalk	-.02	.10	.01	.10	.03	.03	.05	.12	.20	.18	1.00	
12. SexActive	.10	.03	.07	.07	.07	.07	.07	.05	.21	.16	.05	1.00

Table 4.7

Interfactor correlations between the variables of interest

Variable	1	2	3	4
1. Vaccine intent	—			
2. Self-efficacy	.51**	—		
3. Response-efficacy	.58**	.50**	—	
4. HPV susceptibility	.33**	.14**	.13**	—

** $p < .01$

Table 4.8

Fit Indices for Confirmatory Factor Measurement Model on HPV Vaccination

Vaccination Model	SB- χ^2	df	SB- χ^2 /df	CFI	RMSEA	p_{close}
Measurement CFA	34	21	1.6	.99	.04	.23

Note. SB- χ^2 = Satorra-Bentler scaled chi-square; df = degrees of freedom; CFI = comparative fit index; RMSEA = root-mean squared error of approximation.

Substantive Analyses Testing Hypotheses

The experimental study tested whether the narrative-based video intervention promoting HPV vaccination impacted vaccination intent, self-efficacy, response-efficacy, susceptibility, and actual HPV vaccination uptake among college women. Narrative-based messages were compared to didactic vaccine messages (control messages). The analysis plan consisted of first testing whether the treatment groups impacted vaccination intent (immediate posttest), followed

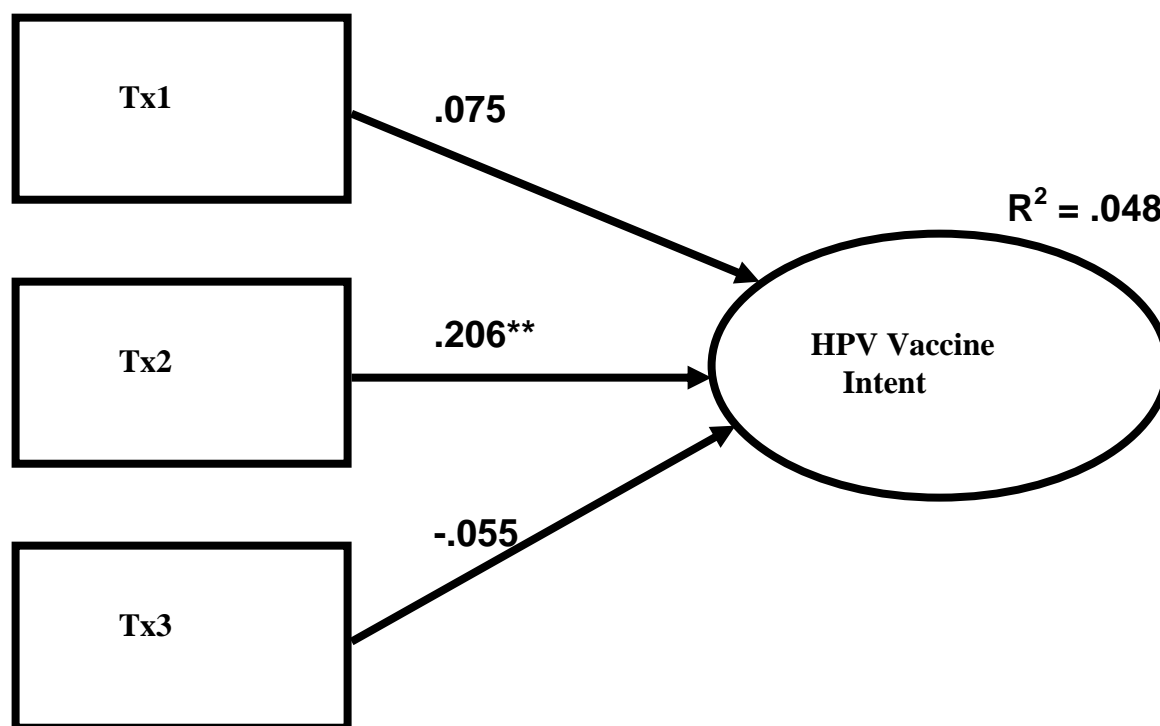
by testing vaccination uptake (two-month follow up), followed by testing the impact of the intervention on perceptions of self-efficacy, response-efficacy, and HPV susceptibility.

H1. Participants receiving one of the three narrative-based interventions will show greater HPV vaccination intent than participants in the control groups.

H1a. The provider-peer intervention will have the strongest effect.

Figure 4.1

Structural Equation Model of Treatment versus Control Comparison on HPV Vaccine Intent



The model (see Figure 4.1, representing hypothesis 1) included HPV vaccination intent as a latent factor and the three exogenous, observed treatment variables. The predicted model was

identified ($df = 2$). The structural equation model showed that only the combined peer-and-provider condition (treatment 2) significantly increased HPV vaccine intent ($\gamma = 0.206, p < .000$) while the peer-only (treatment 1) ($\gamma = .075, p = .234$) and provider-only (treatment 3) ($\gamma = -.055, p = .390$) showed no significant effect on vaccine intent compared to control conditions.

R^2 for HPV vaccination intent was .048 indicating that the narrative-based video intervention accounted for approximately 5% of explained variance in vaccination intent. Hypothesis one, which asked whether *each* of the narrative-based treatments led to higher vaccine intent than control messages, was not supported. Hypothesis 1a however, which asked whether the combined source intervention showed the strongest effect was statistically supported.

H2. Participants receiving one of the three narrative-based interventions will show greater HPV vaccine uptake (adoption) than participants in the control groups.

H2a. The provider-peer intervention will have the strongest effect.

H2b. The relationship between intervention and vaccine uptake is mediated by intent.

To answer hypothesis 2 (see Figure 4.2), binomial logistic structural equation modeling was conducted since the outcome variable vaccination was binary (have you been vaccinated: yes/no). Controlling for HPV knowledge, sexual activity, and daughter-parent vaccine communication, the standardized path coefficients between intervention and vaccine intent showed that only the combined peer-and-provider narrative (treatment 2) significantly increased vaccine intent ($\gamma = .206, p < .000$) while the peer-only (treatment 1) ($\gamma = .074, p < .241$) and the provider-only (treatment 3) ($\gamma = -.055, p < .392$) showed no significant effect on HPV vaccine intent. The standardized path coefficient between HPV vaccination intent (immediate posttest) and vaccination adoption (2-month follow up) was statistically significant ($\beta = .61, p < .000$)

(see Figure 4.2). These results showed that only for the combined peer-and-provider intervention (treatment 2), did HPV vaccine intent significantly mediate vaccination uptake and that the intervention significantly albeit indirectly increased HPV vaccination. Direct effects between the intervention and vaccination were not statistically significant (treatment 1 \Rightarrow vaccination: $\gamma = .057, p = .45$; treatment2 \Rightarrow vaccination: $\gamma = .052, p = .46$; treatment3 \Rightarrow vaccination: $\gamma = -.106, p = .252$). In the model, R^2 for HPV vaccination (binary outcome) was 41% while R^2 for intent (mediator in this model) was 5% (see Table 4.9 for summary of parameter estimates).

HPV vaccination uptake was significantly mediated by intent for the peer-and-provider treatment. Mediation between vaccination and the peer-only and the provider-only interventions was not supported statistically. Therefore, hypothesis 2, which predicted that *each* of the narrative interventions would have stronger effects than non-narrative interventions, was not supported. However, hypothesis 2a, which predicted that the combined intervention would show greatest impact on vaccine uptake was supported. Hypothesis 2b, which predicted that vaccine intent mediated the relationship between narrative intervention and uptake was partially supported because there was significant mediation for the combined intervention.

Figure 4.2 Mediation Model of a Narrative-based Video Intervention on Vaccine Uptake, Mediated by Intent (hypothesis 2)

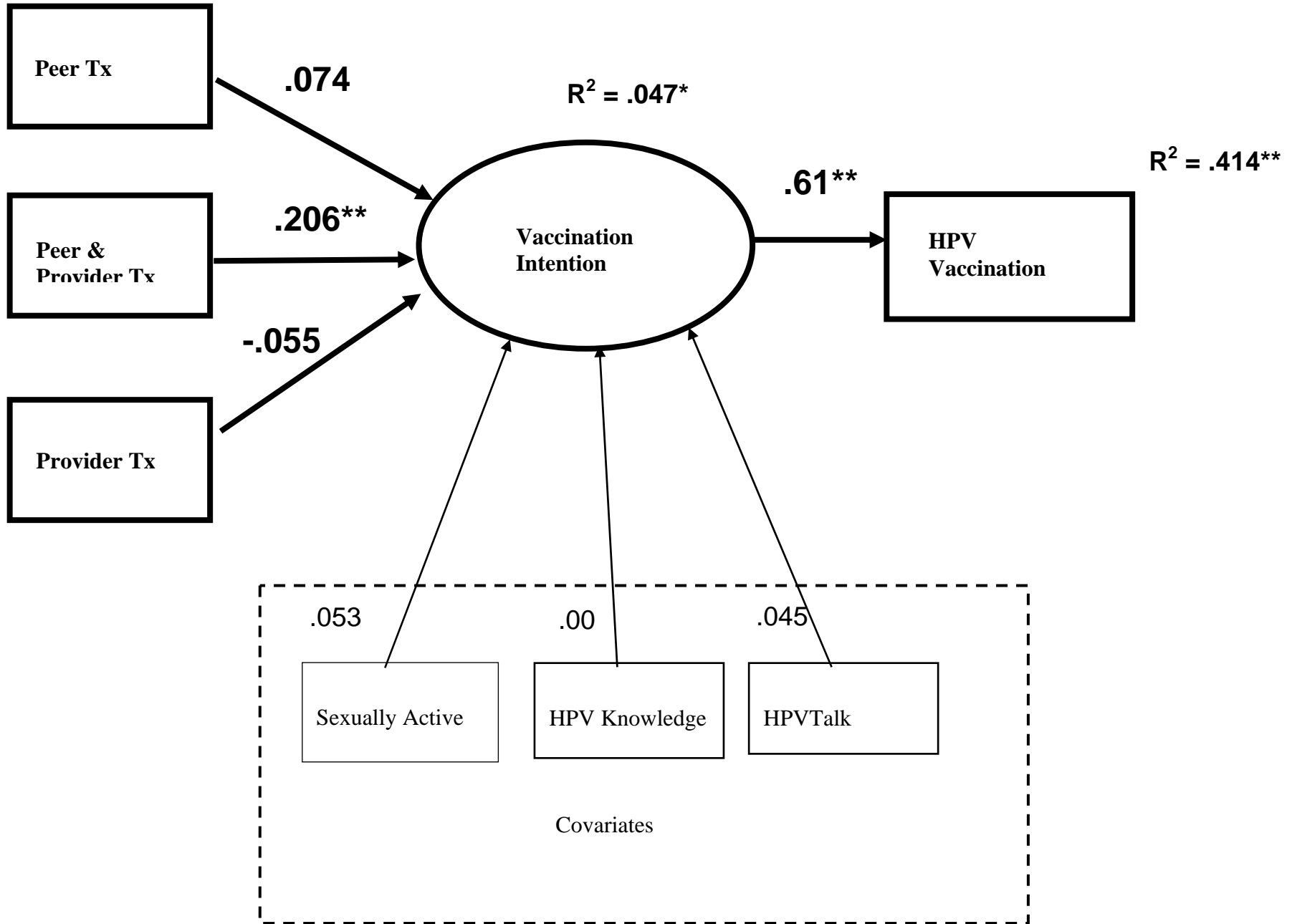


Table 4.9

Standardized Parameter Estimates for the Structural Equation Model Testing a Narrative-based Video Intervention on HPV Vaccination Intent and Uptake, controlling for HPV knowledge, sexual activity, and daughter-parent vaccine communication (N = 404)

Path	Parameter Estimates for HPV Vaccination
Treatment 1 \Rightarrow Vaccine Intent (γ)	.074
Treatment 2 \Rightarrow Vaccine Intent (γ)	.206**
Treatment 3 \Rightarrow Vaccine Intent (γ)	-.055
Vaccine Intent \Rightarrow Vaccination (β)	.610**
Treatment1 \Rightarrow Vaccination (γ)	.057
Treatment2 \Rightarrow Vaccination (γ)	.052
Treatment3 \Rightarrow Vaccination (γ)	-.106
HPV Talk	.045
Sexually Active	.053
HPV knowledge	.000
R ² Intention	.047*
R ² Vaccination	.414**

Note. γ = Structural paths between treatment and intention and direct paths on vaccination;

β = structural path between intention and behavior.

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

A review of participants who vaccinated two months post-intervention ($n = 61$) showed that participants exposed to the combined peer-and-provider narrative (22%) were twice as likely to vaccinate compared to participants exposed to controls (12%). This pattern was statistically significant (see Table 4.10): $\chi^2(3, 404) = 8.6, p < .035$.

Exposure to peer-only narratives (treatment1) also led to an increase in vaccination compared to controls. Those exposed to provider-only narratives (treatment 3) on the other hand were less likely to vaccinate compared to controls.

Table 4.10

Vaccine Uptake Across Treatment and Control Groups

	Tx1	Tx2	Tx3	Control
Vaccinated	18% (18)	22% (22)	6% (3)	12% (18)

Note. Percentages are computed proportions within conditions. Tx1 had 100 participants, Tx2 had 100 participants, Tx3 had 50 participants, and the combined control conditions had 150 participants.

H3. Controlling for daughter-parent HPV communication, self-efficacy mediates the effects of narrative-based vaccine messages and vaccine intent.

Controlling for daughter-parent vaccine communication (the other 2 covariates were dropped from the SEM analysis since they did not significantly contribute to the model), the combined peer-and-provider condition (treatment 2) significantly increased self-efficacy ($\gamma = .263, p < .000$), while the peer-only (treatment 1) ($\gamma = .116, p < .057$), and the provider-only (treatment 3) ($\gamma = -.089, p < .100$), showed no significant effect on self-efficacy (see Table 4.11; Figure 4.3). The standardized path coefficient between self-efficacy and intent was statistically significant ($\gamma = .480, p < .000$) indicating that greater self-efficacy significantly increased HPV vaccine intent. In turn, HPV vaccine intent significantly increased the likelihood of vaccinating ($\gamma = .587, p < .000$).

Table 4.11

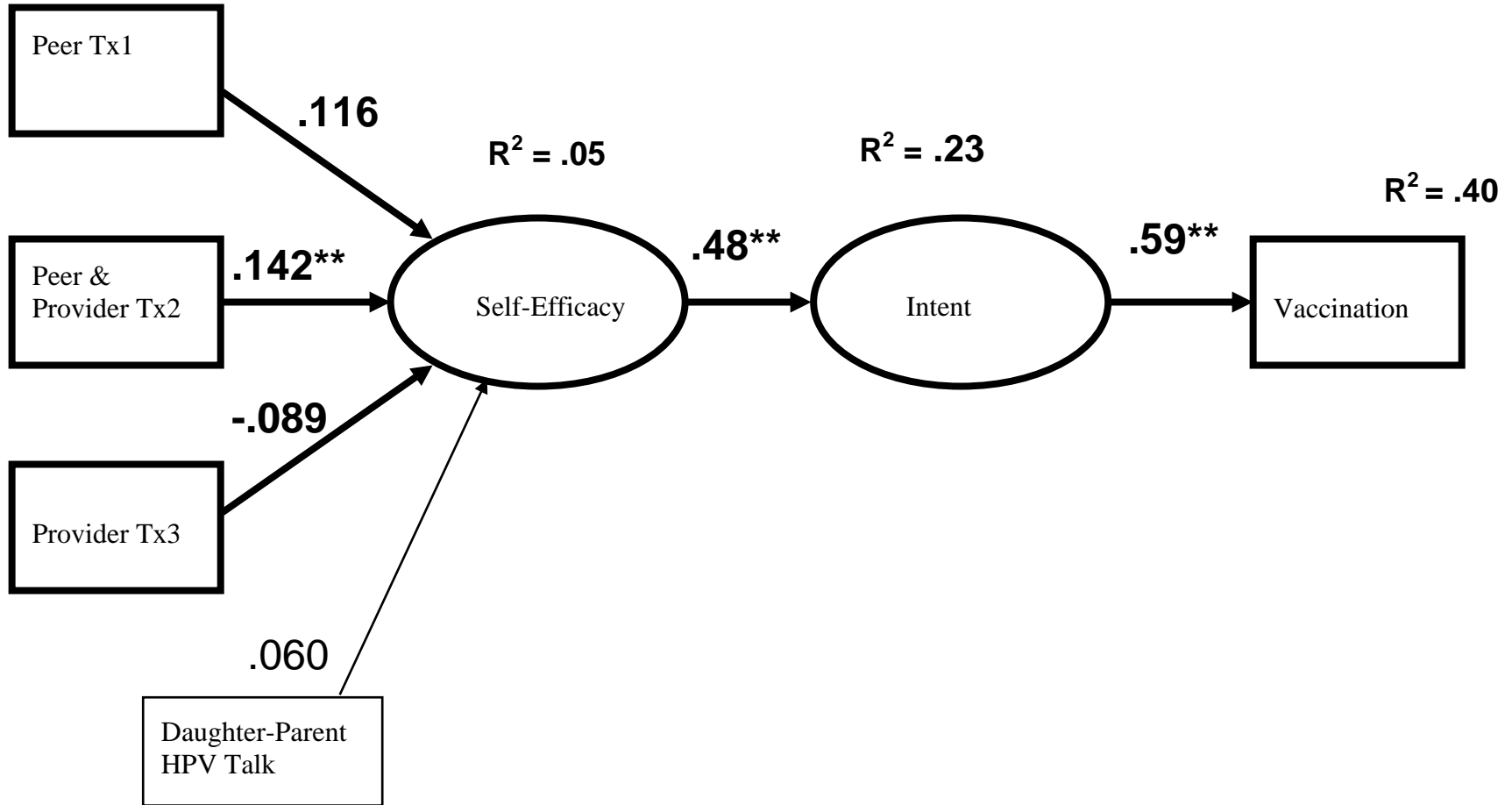
Controlling for Daughter-Parent Vaccine Talk, The Effects of a Narrative Intervention Promoting HPV Vaccination on Perceptions of HPV Vaccine Self-efficacy, Intent and Uptake
($N = 404$)

Path	Standardized Parameter estimate for HPV Vaccination
Treatment 1 \Rightarrow Self-Efficacy	.116
Treatment 2 \Rightarrow Self-Efficacy	.142**
Treatment 3 \Rightarrow Self-Efficacy	-.089
Self-Efficacy \Rightarrow Vaccine Intent	.480**
Vaccine Intent \Rightarrow Vaccination	.587**
Treatment1 \Rightarrow Vaccination	.067
Treatment2 \Rightarrow Vaccination	.086
Treatment3 \Rightarrow Vaccination	-.122
HPV Talk	.060
R ² Self-Efficacy	.050
R ² Vaccine Intent	.231**
R ² Vaccination	.400**

Note. γ = Structural paths between treatment and intention; β = structural path between intention and behavior.

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

Figure 4.3. A Narrative-based Intervention’s Impact on Self-Efficacy, Intent, and Vaccine Uptake controlling for Daughter-Parent Vaccine Communication



Hypothesis four tested whether the inclusion of health care providers played a necessary role for increasing response-efficacy (i.e., whether the vaccine was perceived as effective and safe).

H4. Narrative-based HPV vaccine messages that include health care providers (treatments 2 and 3) will have greater effects on HPV vaccine response-efficacy than narrative-based messages that include only peers or control messages.

The standardized path coefficient between the provider-only intervention and response-efficacy was not statistically significant ($\gamma = -.398, p = .518$). Likewise, the standardized path coefficient between the provider-and-peer intervention and response-efficacy ($\gamma = .665, p = .38$) was also not statistically significant. Hypothesis 4 was not supported. The fifth hypothesis tested whether peers were necessary for impacting HPV susceptibility.

H5. Narrative-based messages that include only peers (treatments 1 and 2) will have greater effects on perceptions of HPV susceptibility than the narrative-based messages delivered only by health care providers or the control messages.

Standardized path coefficients between the peer treatments and HPV susceptibility were not statistically significant (treatment 1 \Rightarrow HPV susceptibility, $\gamma = .087, p = .181$; treatment 2 \Rightarrow HPV susceptibility, $\gamma = .022, p = .725$; treatment 3 \Rightarrow HPV susceptibility, $\gamma = -.019, p = .738$).

Hypothesis five was not statistically supported.

Discussion

This study tested exemplification theory in a new domain—namely, a public health context specifically HPV vaccination. While the tests of the study hypotheses were mixed, overall the results were generally supportive of predictions derived from theory. As a form of narrative, the inclusion of peer and health care provider exemplars to HPV vaccine informational

messages positively and significantly impacted perceptions of HPV vaccine self-efficacy, intent, and most importantly vaccination uptake. These findings demonstrate exemplification theory's value beyond influencing perceptions to influencing behavior in particular, HPV vaccine adoption. The findings from this study have both theoretical and practical implications.

Theoretical Implications of the Study

The effect of narrative (exemplar-based) messages, varied by source, were examined for their ability to increase HPV vaccine efficacy, intent, susceptibility, and uptake among college-aged women. A number of important findings emerged from the study.

First and foremost was the intervention's positive impact on behavior—HPV vaccine uptake. The narrative intervention that included peer *and* provider exemplars significantly increased HPV vaccine adoption relative to those in the control groups. In doing so, the present study extends exemplification theory to a new persuasive context (i.e., behavior change) to show that the inclusion of exemplars to informational messages can impact behavior change (Zillmann, 2006). The evidence from literature has called for combining informational and exemplar health messages for a more powerful message impact on health decision-making (Allen et al., 2000; Greene et al., 2006). The present study verifies that combining statistical with exemplar-based messages is more persuasive than no-message and no-exemplar controls. Peer and expert exemplars used jointly produced significant message and behavior change effects while peer-only and expert-only exemplar-based vaccine messages did not.

These significant intervention effects were observed despite participants being exposed to strong media attention to HPV vaccination, which included both promotional and negative HPV vaccine reports and had the potential to dampen intervention effects (Fan, 2002; Snyder &

Hamilton, 2002). The current study controlled for media exposure by including HPV knowledge as covariate.

Combining peer-and-provider narratives amplified rather than dampened message effects. One explanation for why the combined narratives proved more effective than either alone resides in recommendation consensus. Reinforced messages tend to exert positive effects on behavioral intentions (Snyder & Hamilton, 2002; Wang, 2008). Having expert narratives reinforce peer narratives appears to boost perceived credibility especially when environmental messages (e.g., media, family) are mixed (some media messages favoring vaccination, other messages casting doubt on vaccination). That is, combining narrative sources may simply provide a more powerful message than either narrative source alone.

A second reason that may explain why combined narrative source exemplars were most effective resides in audiences having different message expectations for different sources (Mayer, Fennell, Farmer, & Campbell, 2004; Sanfey & Hastie, 1998). Audiences expect personal narratives from peers and factual narratives from experts. Combining peer and expert exemplars as long as they do not violate source expectations may amplify message effects.

Peers and experts may each play a necessary and complementary role. While each alone may be insufficient, the combined intervention impact on behavior may be serve to enhance. While medical experts may be particularly effective in boosting credibility, peer narratives may play a critical role in increasing perceptions of familiarity, personal relevance, and accessibility (Sundar, 2007; Zillmann, 2006). Peer narratives showed a positive, although non-significant, relationship with HPV vaccine intent compared to controls while expert narratives demonstrated a negative relationship to intent compared to controls. Medical expert narratives alone resulted in boomerang effects.

Unexpected boomerang effects were observed with the provider-only narrative. Expert narratives demonstrated a negative relationship to intent compared to controls (non-significant). Explanations for why exposure to expert only narratives led to lower vaccine intent could be explained by the significantly shorter intervention (i.e., differential dosage effects compared to the other interventions). This appears to be the likely explanation since inclusion of expert exemplars in the combined intervention were evaluated favorably.

Source may play an especially critical role in HPV vaccination. Unlike dieting and exercise, which the public assumes are “good for you”; the public still has significant trust issues with vaccines (Downs et al., 2008). Many are skeptical and weary about the safety of vaccines. Particularly for public health vaccine campaigns it appears to be necessary to include messages that ensure confidence and trust in the safety of the product (e.g., a vaccine) and medical experts may be able to do this to a greater extent than peers. While peer narratives may engage college-women’s attention initially and possibly render messages personally relevant, without the inclusion of medical experts, narratives may appear less credible and even gossipy. Health professional experts reinforcing peer messages appear to boost credibility of vaccine narratives and be critical for impacting vaccination behavior.

Campaign message effects of 5% in the current study are in line with the average effect size reported in a meta-analysis of public health campaign effects (Snyder & Hamilton, 2002). The meta-analysis showed that for persuasion campaigns the average campaign effect size on behavior is $M_r = .05$. Participants exposed to the peer-and-provider intervention were twice as likely to vaccinate (22%) compared to participants exposed to a control condition (12%).

Demonstrating significant positive effects of combining peer and health care provider narratives on vaccine behavior was important for several reasons. While many health

communication scholars often assume that intent leads to behavior change, this relationship varies depending on the health behavior (Marteau & Lerman, 2002; Webb & Sheeran, 2006). For instance, pre-symptomatic predictive genetic testing rarely translates into testing uptake (Marteau & Lerman, 2002). Vaccination was thought to be similar to genetic testing because of public mistrust. Individuals typically publicly acknowledge the value of vaccination, however personal vaccination behavior is typically low unless vaccination is mandated. Therefore, for the volitional HPV vaccine to translate into improved health outcomes, it is imperative that communication strategies translate into behavioral changes (i.e., vaccine adoption). For this reason there was practical as well as theoretical interest in demonstrating that HPV vaccine intent translate into increased HPV vaccine adoption among those exposed to the narrative intervention. The results demonstrated that intent was a proximal positive predictor of vaccination in this study. Not only has intent been shown to be important for enacting health behaviors, but self-efficacy was also important in moving individuals who plan to act to vaccinate.

Inclusion of exemplars who overcome barriers to enact a recommended health behavior were expected to increase audience self-efficacy according to Bandura's social learning theory (1986). The current study findings confirmed this exemplar effect. The HPV vaccine literature emphasizes the importance of enhancing self-efficacy (Kahn et al., 2008). Since HPV vaccination is a relatively new health domain there is a need to empirically verify that increased self-efficacy positively impacts vaccine intent, and in turn, translates into increased vaccination. The findings support the importance of vaccine messages explicitly addressing personal efficacy around HPV vaccination.

Hypothesis four asked whether the inclusion of health care provider exemplars increased response-efficacy (e.g., how effective the vaccine is). This hypothesis was not supported. It could be that the health care provider narratives did not convincingly address or allay perceived vaccine harms. Alternatively, it could be that for college-women response efficacy (how effective the vaccine is in preventing HPV) is not one of their foremost concerns with respect to HPV vaccination.

Finally, hypothesis five, which tested whether the inclusion of peer exemplars was necessary for increasing HPV susceptibility was not supported by the analyses. This result was surprising and indicated that in the present study peer narratives did not significantly impact perceptions of HPV susceptibility. These non-significant results could indicate a number of issues. First, it could be that the narratives were not enough of a dose to impact susceptibility perceptions. Second, it could be, given the stigma associated with HPV, that audience reactions more commonly respond with denial or distancing of the possibility of acquiring HPV. Even among college women who vaccinate, they rarely admit or recognize the possibility of acquiring HPV personally. Alternatively, there is the possibility that college women are willing to vaccinate without feeling personally susceptible to HPV. College women may see their vaccine choice as a preventive measure against cervical cancer never acknowledging HPV susceptibility.

Summary of Theoretical Contributions. The current study adds to the exemplification literature by demonstrating that source type is important in relation to the protective health behavior being advocated. Not all exemplars are equally effective. Combining peer and expert exemplars provides a persuasive strategy to impact HPV vaccination. The combination of peer and expert sources in addition to informational messages may simultaneously increase accessibility and credibility (Zillmann, 2006). Exemplars can be used to move opinion in a

desired direction, create perceptions about public sentiment, or even create impressions about the future success of an issue (Perry & Gonzenbach, 1997). Combining exemplar sources may reach a larger audience including those who initially resist HPV vaccination. Finally, the present study shows that exemplar source matters and can have significant message impact (i.e., exemplification effects) not only on the formation of beliefs but also on behavioral outcomes.

Practical Importance of the Study

A one-time brief video intervention that increases HPV vaccination offers a cost-effective strategy to improve public health outcomes (Caskey et al., 2009). The present study offers a relatively simple campaign promoting HPV vaccination. The impact of the intervention is likely underestimated since many college women return home during the summer where they are more likely to vaccinate. These women's vaccine decisions were not captured in this study because the 2-month follow-up ended at the end of the spring semester. This study offers one of the first reported HPV vaccine interventions to effectively promote HPV vaccination among college-aged women.

It is rare that effective communication strategies demonstrate their translational effects directly on behaviors. For every additional individual vaccinated, there is likely a reduced health care burden with respect to HPV infection and related complications (psychosocial, medical, and financial). The peer-and-provider intervention significantly increased vaccination compared to control conditions thereby, reducing adverse public health outcomes related to HPV. Exposure to the combined peer-and-provider narrative intervention also significantly increased self-efficacy in college women, which can be viewed as a separate positive effect of the intervention.

University student health centers can benefit from such a video intervention, which does not require a counseling component and may even save health care staff time by covering the

basics of HPV vaccination and arousing interest in college women to follow up during clinic visits. Similar to health care video interventions in other settings, this narrative-based intervention (the peer-and-provider version) has the potential to reach large numbers of college women (>16,000 women at one university). Furthermore, the benefits of a video intervention are that it is low cost relative to other types of interventions.

The current intervention may serve the added benefit of correcting misinformation. For instance, many college women erroneously believe that it is too late for them to receive HPV vaccine benefits. This exemplar-based video intervention explicitly addresses and corrects this misinformation that is common among college-aged women.

The inclusion of exemplars particularly for online videos may be particularly pronounced and advantageous. However, the present study shows caution in developing these types of exemplars. Clearly not all exemplars are persuasive. Peers appear to be a necessary ingredient in positive audience responses, however the content of these peer narratives must resonate as authentic and their performances (in video or film) also appear to play an important role in how audiences respond to narrative messages. The boomerang effects observed in the provider-only intervention were unexpected yet a possible explanation rests with the intervention's weaker narrative coherence. Peer re-enactments had to be removed from the provider-only intervention (to isolate source effects) resulting in a less cohesive narrative. This may explain why the provider-only narrative was poorly evaluated by college-aged women. College populations who consume a lot of online media are critical consumers of such formats and have high expectations for messages delivered in online video mediums.

Strengths of the Study

HPV vaccine messages were tested for their impact on behavior, a critical outcome of interest given that increased vaccination is the surest way to improve health outcomes related to HPV. While several studies in the literature have reported on HPV vaccine knowledge and attitudes, this study is the first to report on a randomized controlled HPV vaccine intervention positively impacting vaccine adoption rates. The intervention demonstrated significant increased HPV vaccine uptake. The intervention also showed significant longitudinal effects. Most HPV vaccine studies to date have been cross-sectional (Brewer & Fazekas, 2007). Assessing message impact on vaccine adoption at two months post intervention exposure with positive results lends significant validity to the intervention. Finally, random sampling and assignment allows for inferences to be made with confidence that study findings hold beyond the sample and can be inferred to the population reflecting 18-26 year-old college women at this university.

Inclusion of control messages allowed for ruling out alternative explanations. For instance, inclusion of a control messages using the same text and video format but excluding the exemplars allowed for ruling out alternative explanations related to message channel delivery effects (video versus webpage).

Finally, this study reports on one of first source effects study that combined peer and expert exemplars for a public health campaign. The current study filled a gap in the literature, in which studies typically compare peers versus experts but rarely combine them. Furthermore, the study advanced knowledge that peer and expert narratives can be combined to amplify credibility effects and that adding experts will not dampen message effects. Health message designers will of course always benefit from formative research given the specific health topic to determine whether source plays a crucial communication role when undertaking influence attempts for health campaigns.

Limitations

Several limitations of the study should be noted. First, the provider-only treatment, which proved shorter in length, did not permit differential dosage effects to be ruled out as an explanation for why the provider-only narrative intervention negatively impacted vaccine intent compared to controls. A second limitation also related to the provider-only treatment was that participants exposed to this condition vaccinated less ($n = 3$) constituting sparseness with respect to cell size when modeling the intervention effects. An integration algorithm was used to compute the path coefficients for the sample exposed to this condition—an acceptable solution (Muthen & Muthen, 2007). The low counts of vaccination adoption for this group compared to other treatment groups may, in fact, demonstrate that the other treatments are superior in increasing vaccination adoption further validating the findings. A third limitation was the use of only two items per latent factor for most of the latent factors in the SEM model. Poor performance at the item level did not allow the latent factors to be measured by a greater number of items. Finally, a fourth limitation includes the remaining ambiguity in explaining precisely why the combined peer-and-provider narrative intervention significantly increased vaccine intent and uptake.

Future Research

Further research is still needed to clarify precisely how peer and health care provider messages increase HPV vaccine acceptance while avoiding potential boomerang effects. When experts deliver health information in didactic styles (e.g., “you should ...stop smoking, vaccinate, etc”) especially to college-aged populations boomerang effects are likely to occur. Furthermore, whether health professionals are key sources for delivering response-efficacy messages needs to be answered. Finally, further testing narrative language strategies for their

hypothesized ability to reduce reactance and to generate self-reflective thinking, which may in turn lead to increased message acceptance and adoption of advocated behaviors is another avenue of narrative research.

More importantly however, is extending the current prevention research to populations in greatest need of HPV prevention given its recognized link to cervical cancer. Hispanic, African-American, Vietnamese-American, and Appalachian female populations have the highest rates of cervical cancer mortality in the United States and worldwide. Additionally, it is these populations who have the least access to Pap test screening and to HPV vaccination (CDC, 2009). Future efforts are needed to extend narrative prevention campaigns to reach these populations, increase HPV vaccination among these groups, and reduce HPV related morbidity and mortality.

Chapter Five

Mechanisms of Narrative Persuasion for Health Promotion Contexts

Abstract

Narrative communication has been proposed as a promising tool for public health campaigns yet it remains unclear *how* narrative communication imparts influence. Drawing on entertainment-education and culture-centric narrative theory, a narrative communication model for health promotion was proposed that predicted identification with media characters and narrative transportation to directly mediate the relationship between a narrative intervention and HPV vaccine intent while perceived realism and vividness were predicted to indirectly contribute toward explaining narrative effects on vaccine intent. Structural equation modeling was used to simultaneously test the relative contributions of the four hypothesized narrative mediators. The model tested college women's ($N = 250$) evaluations of a promotional HPV vaccine video intervention (peer-only, expert-only, or a combined peer-and-expert narrative). Theory derived hypotheses were for the most part supported. Identification significantly and positively mediated the relationship between peer narratives and increased HPV vaccine intent accounting for 71% of explained variance in the model. Narrative transportation indirectly impacted intent via identification accounting for 56% of explained variance in the model. Vividness, defined as the formal properties of the video medium, increased narrative transportation accounting for 9% of explained variance. Finally, and contrary to predictions, perceived realism did not significantly contribute to explained variance in vaccine intent in the model. Overall, narrative mediators in the model explained 31% of variance in HPV vaccine intent. Theoretical and methodological contributions to the narrative communication literature for health promotion are discussed.

Mechanisms of Narrative Persuasion for Health Promotion Contexts

Narratives are receiving increasing attention in the communication literature for their persuasive impact (Cappella & Hornik, 2009; Green, 2006; Hinyard & Kreuter, 2007; Kreuter et al., 2007). Explanations for why people seem to prefer narratives over didactic communication forms range from claims that humans have an inherent appeal for narrative learning and therefore, respond positively to narrative messages, to narratives being more engaging, interesting, and attention holding than didactic informational messages (Fisher, 1984; Mar, 2004). While all these explanations have logical force, it is still not clear why narratives have such force. This gap in our knowledge not only restricts theoretical insight but, also, limits health communication scientists' efforts to intervene in public health and other significant social issues. This study seeks to advance understanding about the mechanisms of narrative persuasion for public health campaigns

Defining Narrative Communication

Narratives have been defined in several different ways in the communication literature. Narrative communication often encompasses entertainment-education, which defines narratives foremost as entertainment with embedded health messages (Moyer-Guse, 2008; Murphy, 2009; Slater et al., 2006). These types of narratives have been typically delivered via television, radio, and feature length films and in the United States; such narratives include television series such as *Friends* or *Desperate Housewives*. By contrast, public health campaigns or prevention interventions, developed and delivered as narratives, differ from entertainment-education as well as from informational-educational health campaigns. Narrative-based public health campaigns commonly reflect the language or slang used by the target audience and represent the target

audience's viewpoint about the health issue. Thus narratives for health promotion contexts as defined in this study are neither purely entertainment nor didactic health messages; rather they are a way of communicating about and understanding a phenomenon. This type of conceptualization sees narrative as a culturally derived justification for why narrative forms are thought to more effectively reach certain audiences by mirroring and representing authentic and personalized 'audience' perspectives on an issue.

Narrative Persuasion Mechanisms

Communication theorists have argued that narrative processing is a distinct mental process (Green & Brock, 2000; Moyer-Guse, 2008; Slater & Rouner, 2002). Communicating health messages in narrative form as defined in this study is thought to invoke narrative learning—an experiential form of learning that draws on indexing of experiences. Routes of experiential learning then are understood by the degree to which audiences identify, have interest, and engage in these communicated narratives. Examining the relative role that each of these constructs plays in explaining not only audience response to narratives, but also which of these audience responses impacts behavioral intent is examined in greater detail in the present study.

The extant narrative literature delineates two audience responses that are hypothesized to directly translate into increased behavioral intentions: narrative transportation (Slater & Rouner, 2002) and identification with the media characters (Kreuter et al., 2007; Larkey & Hecht, 2009); while two additional constructs: perceived realism (Busselle et al., 2004) and vividness (Green et al., 2009) are hypothesized to impact behavioral intent indirectly. Next, I discuss these four hypothesized mechanisms of narrative persuasion for how they relate to behavioral intent.

Narrative Transportation

Transportation is the act of becoming psychologically immersed into the [viewing] activity of a narrative (Green & Brock, 2000). The notion of narrative transportation has been equated with “being carried away or lost in a story.” Transportation has been applied not only to understanding narrative effects when reading novels, but also when listening to radio stories, watching television, or even short film interventions (Green et al., 2009).

Narrative transportation has been given several different labels in the literature including narrative engagement, absorption, immersion, and involvement. Green (2009) claims that engagement and absorption are more general concepts. In contrast, transportation is conceptualized as an experiential response that includes imagery and attention in addition to engagement. The main idea consists of being engaged in the storyline rather than in one’s immediate environment and experiencing vicarious emotional and cognitive responses to the narrative. The strength of a narrative, thus, lies in its ability to create an emotional experience that can engage, move, stimulate, provoke, and consequently, produce desired changes. Put another way, transportation is defined as a convergent process where all mental systems and capacities become focused on events occurring in the narrative (Green & Brock, 2000).

While media scholars’ interest in narratives resides in understanding how transportation affects media enjoyment, health communication scholars’ interests reside in understanding how narrative transportation can lead to adoption of advocated health behaviors (Green et al., 2006; Hinyard & Kreuter, 2007). A number of studies have applied a narrative approach with positive outcomes however few studies have examined whether transportation explains how narratives promote health behavior changes (Braverman, 2008; Miller et al., 1998; Moyer-Guse & Nabi, 2008; Murphy, 2009; Smith et al., 2007).

Braverman (2008) found that transportation effects were especially pronounced for video delivered testimonials and for low-involved audiences. Increased transportation led to increased behavioral intent. Murphy tested transportation for its effects on health attitudes and behavior and found that transportation indirectly impacted attitudes via identification (2009). Moyer-Guse and Nabi (2008) who contrasted different narrative models also found that transportation impacted intentions via identification. Finally, Smith and colleagues (2007) tested the effects of engagement in a multi-series radio show that had embedded messages about condom use and HIV protection. These results showed that increased viewings led to increased involvement and this in turn, led to increased behavioral intentions (i.e., condom use). These findings lend validity to the importance of transportation in explaining narrative effectiveness.

Yet effective narratives also hinge on taking narrative source into consideration and asking the question, “Who would be the most typically represented source for this information within this particular cultural and age group?” Peer talk may be the most important source of influence among college students. Social learning and entertainment education theory emphasize that perceived similarity (e.g., age) as well as perceived similar point of view between message recipient and characters in a narrative can be crucial if a message is to influence attitudes or behavior. The fact that peer narratives in the present study take place in a dorm room with social references (going to the dining hall for lunch with friends) will render these narratives more engaging to college students than health care provider narratives. Therefore, it is expected that college women will be more transported by peer than by provider narratives.

H1. Transportation mediates the relationship between narrative source and HPV vaccine intent.

H1a. College women will be more transported by peer narratives than by provider narratives.

H1b. Transportation will be positively associated with HPV vaccine intent.

Equally important to explaining narrative effectiveness appears to be audience members connecting with media characters.

Identification with Media Characters

Connecting with the character/s in a narrative can enhance narrative effectiveness. In fact, this appears to be a crucial determinant of behavioral change (Larkey & Hecht, 2009; Slater & Rouner, 2002). According to Shrank and Engels (1981) identification between audience member and characters in the narrative is a prerequisite to gaining insight. Precisely what “connecting with media characters in a narrative” entails has been conceptualized in slightly different ways by different researchers. There is still no consensual agreement among scholars (Murphy, 2009). The meaning of identification with media characters has ranged from perceived similarity, liking, empathy for characters, and wishful identification including parasocial relationships. Zillmann (1994) pointed out that identification means that the knowledge of the audience members is processed from the character’s perspective and is transformed into empathic emotion. Cohen (2001) similarly conceptualized identification as a process that leads to the temporary adoption of an external point of view and to viewing the world through an alternative social reality.

Conceptualizations of identification based in external similarities between audience and media characters (e.g., demographics) have inconsistently predicted narrative effectiveness (Andsager et al., 2006; Brosius, 1999; Guttman et al., 2008). As a result, such conceptualizations of identification were not considered in the present study. By contrast, Cohen’s (2001) conceptualization of identification is based in an audience response of empathy for media

characters and temporarily adopting their perspective, i.e., what Sood (2002) refers to as referential reflection. Such a conceptualization of identification (i.e., an audience response of empathy) appears to reliably predict audience response (Zillmann, 1994). Cohen's (2001) conceptualization of identification was therefore, adopted in the present study. A media character's ability to elicit an emotional connection of empathy and have audiences experience their viewpoint seems to be central to persuasive effects of narratives in promoting health behaviors (Kreuter et al., 2007; Larkey & Hecht, 2009).

Identification with media characters allows the audience to experience social reality from other perspectives and thereby, shape social attitudes. Like transportation, identification with media characters is expected to increase viewers' acceptance of the values and beliefs portrayed in a narrative (Slater & Rouner, 2002). Additionally, identification appears to be positively related to increased attention, mental rehearsal of the arguments presented, and modeling of behavior (Sood, 2002). The importance of identification with media characters has been recognized across theories of narrative communication (Larkey & Hecht, 2009; Miller et al., 1998; Moyer-Guse, 2008; Slater & Rouner, 2002). This recognition is grounded in the notion that identification with media characters can have important effects on willingness to accept messages and in health promotion that message acceptance moves audiences closer to adopting advocated behaviors.

Peer characters establish a direct relationship between a college-aged audience and like-aged media characters (Andsager et al., 2006; Brosius, 1999). Furthermore, the peer narratives provide the social stories that resonate with the college-aged audience. Thus, peer narratives are expected to elicit greater identification than provider narratives.

H2. Identification mediates the relationship between narrative source and HPV vaccine intent.

H2a. College women will identify more with peer-only narratives than provider narratives.

H2b. Identification will be positively associated with HPV vaccine intent.

The conceptual relationship between narrative transportation and identification is murky. Although narrative engagement and identification with media characters reflect distinct concepts there is some overlap when they are understood as audience responses. Many narrative theorists (Cohen, Hecht, Larkey, Miller-Day, Moyer-Guse, and Slater) acknowledge that the relationship between transportation and identification has not yet been clearly specified—transportation could precede or come after identification. Miller and colleagues (1998) conceptualize narrative engagement as encompassing identification. While viewers are engaged in a narrative, they are more likely to become involved with the characters. But narrative themes must foremost speak to audiences, otherwise they will not identify with the media characters. This led to the following hypothesis.

H3. Transportation will be positively associated with identification.

H3a. Identification mediates the relationship between HPV vaccine intent and transportation.

An often neglected issue is that in video or film narratives (such as presented in the current research), identification and transportation may be promoted or inhibited by the technical production features. This is referred to as vividness in the current study given that it is a video delivered intervention and the emotional and cognitive elements are already measured in identification and transportation.

Vividness

Vividly presented narratives that are congruent with the message are generally thought to be more persuasive (Smith & Shaffer, 2000). Vivid narratives or exemplars attract attention, evoke emotion, and are remembered to a greater extent (Baesler & Burgoon, 1994; Sundar, 2003; Taylor & Thompson, 1982; Zillmann & Brosius, 2000). Nisbett and Ross (1980) define vividness by exemplar ability to elicit emotionally interesting and proximal (in a sensory way) information while Taylor and Thompson (1982) define vividness by its ability to produce mental imagery. Biocca (2002) on the other hand, defines vividness by the sensory richness of a medium. Biocca's definition of vividness is adopted in the present study.

Narratives delivered in film or video mediums may transport audiences to a greater extent than texts because of their vividness (Busselle & Shrum, 2003; Green et al., 2009; Zillmann, 2002). High quality video format could increase transportation and identification relative to a web-based medium (text-only) by increasing the feeling of presence (Green et al., 2009). Vividness in this sense allows audiences to experience narratives as if they were real world encounters with the exemplars functioning as surrogates. The sensory richness of video delivered exemplars may increase the ease or fluency with which individuals enter a narrative world. The visual presentation including the acting or "performance" may be especially powerful (Miller-Day, 2008b). Gerrig and Prentice (1996) suggested that the formal properties of video or film particularly in the way it focuses viewers' attention may increase perceptions of immersion or narrative transportation.

H4. Vividness mediates the relationship between transportation and narrative source.

H4a. Peer narratives will be perceived as more vivid than provider narratives.

H4b. Vividness will be positively associated with transportation.

H4c. Vividness will be positively associated with identification.

Gerrig (1996) brought attention to the formal properties of video narratives being interpreted with a heightened perception of realism.

Perceived Realism

Perceived realism refers to the extent to which audiences perceive mediated content to be realistic or authentic. Miller (1998) has pointed out that for narrative engagement to occur, establishing the perception of realism appears to be necessary. Here perceived realism indicates “a realistic portrayal” or “based on a real case.” Drama theorists also note that perceived realism can be critical to eliciting emotional responses including establishing connections with media characters. If the acting (i.e., the performances) of exemplars as well as the narrative themes are perceived as unrealistic or not authentic then increased disengagement is likely to occur. This was found to be the case in several studies employing narratives for health promotion (Fishbein et al., 2002; Greene & Brinn, 2003; Guttman et al., 2008; Hall, 2003). Therefore, perceived realism understood as authenticity has been identified as a crucial determinant of persuasive narratives (Petraglia, 2009).

Perceived realism of narratives has been conceptualized not only as authenticity, but also as plausibility (Brinson & Brown, 1997; Fisher, 1987; Pennington & Hastie, 1993). Pennington and Hastie (1993) ascribe narrative effects to the perceived plausibility and coherence of narratives—Does the narrative makes sense?, Is it believable? Does it ring true? Assessing plausibility occurs during the process of interpreting narratives for decision-making with the most plausible narrative being the most compelling (Pennington & Hastie, 1993).

While the importance of narrative realism has received less attention in the entertainment-education literature, its importance has been recognized by drama scholars

(Kincaid, 2002) and in the media realism literature (Busselle et al., 2004; Hall, 2003). Perceived realism is hypothesized as a precursor to enhance health narratives advocating a behavior. In this study here, perceived realism is conceptualized as the authenticity and plausibility of exemplar narratives. Audiences feel that what is portrayed in the narrative could happen to them or someone they know. The following hypotheses are generated.

H5. Perceived realism mediates the relationship between narrative source and transportation.

H5a. Peer narratives will be perceived as having more realism than provider narratives.

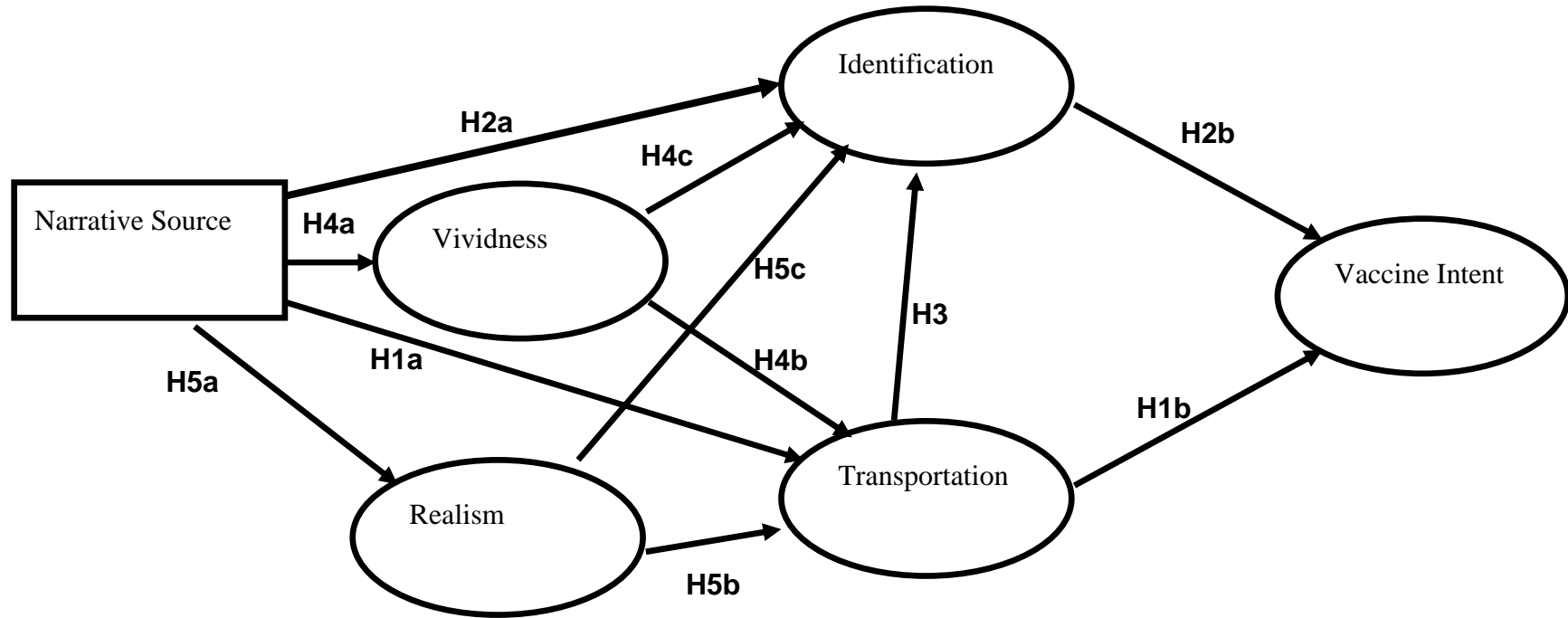
H5b. Perceived realism will be positively associated with transportation.

H5c. Perceived realism will be positively associated with identification.

Summary of Narrative Effects

The present analysis proposes a model of narrative communication effects on HPV vaccine intent (see Figure 5.1). The model integrates the four proposed mediators of narrative processing—identification, transportation, vividness, and perceived realism, based on entertainment education theories (Green & Brock, 2000; Moyer-Guse, 2008; Slater & Rouner, 2002) and a culture-centric narrative theory for health promotion (Larkey & Hecht, 2009).

Figure 5.1 A Hypothesized Theoretical Model of Narrative Processing Effects on HPV Vaccine Intent



Method

A randomized clinical trial was conducted testing the study's hypotheses 1-5, which examined mechanisms of narrative communication¹. Four mediators were tested for whether they explained narrative effects: identification with media characters, narrative transportation, vividness, and perceived realism. These mediators were tested in an integrated model of narrative communication for HPV vaccine promotion.

Study design

The study employed a posttest only randomized design in which participants were assigned to one of three video narrative interventions (peer-only narratives, provider-only, and combined peer-and-provider narrative) or a control not included in these mediational analyses. The posttest-only design was chosen because given randomization (maximizing variance) and the simpler design, as well as this being an independent samples design, there were no added threats to external validity (i.e., to conclusions) over and above those of a pre-post test design (Campbell & Stanley, 1966). The drawback to this design is that experimental error (type II error variance) might be too large to reject the null hypothesis. However, the likelihood of this is higher with sample sizes that are smaller than those in the current study.

Participants first completed a pre-intervention survey asking about HPV knowledge, sexual activity, and daughter-mother vaccine communication. They were then randomized to watch one of five narrative video interventions (2 versions of the peer-only, 2 versions of the peer-and-provider, and 1 version of the provider only). Following the video intervention, participants completed a post-intervention survey evaluating the HPV vaccine narratives.

Participants

¹ Analyses were conducted on the same dataset as reported in chapter 4.

A total of 250 female students between the ages 18 and 26 attending a large northeast university were randomized to view a narrative intervention promoting HPV vaccination. The 250 participants were a subsample of a larger study ($N=404$). Control conditions were excluded from this analysis given that controls had no narrative and no media characters.

Participants were compared across the three treatment groups. There were no significant differences in mean age, year in college, mean HPV knowledge, insurance coverage, ethnicity, place of residence, sexual activity, and daughter-parent HPV vaccine communication (see Table 5.1).

Table 5.1

Summary Table on Demographics Comparing Treatment Groups (N=251)

	Tx1	Tx2	Tx3
Mean Age	21	21	21
Mean Year in College	Junior	Junior	Junior
Mean HPV Knowledge	7.64	7.36	7.50
Insurance Coverage	89% (88)	92% (92)	88% (44)
Caucasian	70% (68)	80% (80)	82% (40)
Suburban	61% (60)	65% (65)	68% (34)
Sexually Active	57% (58)	55% (55)	58% (29)
Parent HPV talk	54% (53)	61% (60)	48% (24)

Note. Tx1 = Peer-only Video; Tx2 = Peer-and-Provider Video; Tx3 = Provider-only Video

Recruitment

Participants were randomly sampled from the university student health center database using a random number generator. An email listserv announcement about the study was sent out

to a random sample of 1000 female students between the ages 18 and 26. Participants who responded with an interest in participating in the study were directed to sign up at the website <http://thepmlab.com/cgi-bin/signup/index.cgi>. After an initial response from 200 students, an additional email was sent producing a response rate of 32% ($n = 320$). Since this number was inadequate after power calculations and additional recruiting efforts were not likely to be fruitful, an additional 80 students were recruited from a convenience sample (a public speaking course). The total sample size from both methods was 404. Participants received 2% course credit for participation.

Chi square analysis and independent sample t tests were conducted to examine whether there were significant group differences between the randomly sampled and the convenience sample population. There was no evidence that the two groups differed significantly across a number of demographic variables including reported sexual activity: $\chi^2(2, 401) = 0.24, p = .89$, place of residence (having grown up rural, suburban, urban): $\chi^2(2, 401) = 2.54, p = .28$, liberal/conservative orientation: $\chi^2(6, 401) = 5.20, p = .518$, and mean HPV knowledge: $t(402) = 0.25, p = 0.80$. As a result, data from the two groups were combined in further analyses.

Survey Procedure

Experimental sessions were conducted in a student computer technology classroom on campus. Participants signed up for a 30-minute time slot using an online signup website <http://thepmlab.com/cgi-bin/signup/index.cgi>. Upon arrival at the computer laboratory, participants were greeted by the investigator, seated at a computer, and briefed about the length and purpose of the study. They then consented to participate, completed a pre-intervention survey about HPV knowledge, sexual activity, and daughter-mother vaccine communication, and

were then randomized to a narrative condition. Following the intervention, participants evaluated the narratives in a posttest survey.

Stimulus Materials

The three treatment conditions were operationalized through five videos representing three conditions (2 versions of peer-only, 2 versions of peer-and-provider, 1 version of provider-only). Limited access to the providers precluded development of comparable reenactments and presents a limitation to the study. Each video included both statistical messages and exemplars in four parts: (1) HPV susceptibility, (2) overcoming self-efficacy barriers, (3) overcoming perceived vaccine harms, and (4) cues to action. These four theoretical components were grounded in formative research identifying these components as important for HPV vaccine decision-making among college-aged women (Hopfer, 2009a). Culturally grounded theory guided formative research, which indicated these four theoretical components as important constructs to include for college populations. The order of the components were designed based on principles established in health message design literature (Maibach & Parrott, 1995). The video therefore, began by establishing relevancy of the message to the recipient (susceptibility), followed by increasing self-efficacy, then addressed perceived vaccine harms, and ended with cues to prompt vaccination adoption (see Appendices F-H for narrative scripts).

HPV Susceptibility. This video component addressed perceptions of HPV susceptibility. Each video opened with the same statistics about the prevalence of HPV framed to be relevant for college populations (e.g., in a classroom of 30 students, as many as 8 have HPV). This segment was followed by 2 exemplars each recounting experiences of knowing someone with HPV thereby, implicitly addressing HPV susceptibility (exemplars varied by condition). In the peer condition, college women told stories of having a close friend or sister acquire HPV,

explaining that these women who acquired HPV were not promiscuous and had acquired HPV from their partners despite being in monogamous relationships. In the provider condition, the exemplars were University Health Services (UHS) health professionals (doctors and nurses) who explained that at UHS, they witnessed firsthand a lot of cervical disease from HPV. In the combined peer and provider condition, one exemplar was a peer and one a health care provider.

Overcoming Self-Efficacy Barriers. The second component of the video was designed to overcome self-efficacy barriers (availability, time, and cost) to HPV vaccine adoption. In all conditions, a text message appeared on screen informing the viewer that the HPV vaccine was available on campus at UHS and that a majority of health insurances covered the cost of the HPV vaccine. In the peer condition, a re-enactment followed depicting the UHS waiting room with college women talking to each other about the HPV vaccine. In the waiting room, discussions informed the viewer that the vaccine was available on campus, was covered for graduate students and for most undergraduate students, and that reminder emails were sent to college women to help them complete their 3-shot vaccine treatment. In the provider condition, the re-enactment was omitted, but the same text as the peer condition (a screen shot with text information) was included, informing viewers of the same information. Finally, in the peer plus provider condition, the same re-enactment and text were used as the peer-only condition.

Overcoming Perceived Vaccine Harms. The third component of the video attempted to address perceptions of harm from the HPV vaccine. All versions began with a screenshot of text stating that catch-up HPV vaccination was recommended for college-aged women (women ages 18-26) and that the Centers for Disease Control and Prevention approved the HPV vaccine as safe and effective. This portion of the video was followed by two direct-to-camera testimonials addressing vaccine safety. In the peer condition, two college-aged women provided testimonials

addressing vaccine safety. The first college student testimonial explained that her doctor explicitly recommended the HPV vaccine to her and that she trusted her doctor's recommendation. A second student testimonial standing in a laboratory (e.g., test tubes and laboratory benches in the background) dressed in a white lab coat, explained that she was a science major and that her familiarity with the FDA approval process of drugs through her research experience led her to be confident in the safety of the HPV vaccine. In the health care provider video, a health care provider from UHS provided a direct-to-camera testimonial recommending the HPV vaccine. The second provider testimonial, also UHS staff, confirmed that what was known for certain about the HPV vaccine was that a number of women exposed to HPV and not vaccinated go on to develop cervical cancer. In the combined peer-provider condition one peer testimonial was included in which a college-aged woman stated that she trusted the recommendation of her doctor. All three treatment conditions ended the video section with a text message stating that the HPV vaccine had been studied for nearly ten years.

Cues-to-Action. The final section of the video was designed to stimulate action. The peer version opened with a re-enactment of a dorm scene with two college women talking on their dorm bed. A third woman walks into the dorm room 20 seconds into the video. This third roommate explains that she just returned from UHS where she was vaccinated for HPV. The three women discuss whether the shot hurt, that the vaccine is recommended for college-aged women, and that the HPV vaccine is nearly 100% effective in protecting against the four most common HPV types. In this conversation, one college woman explains to the other two women that "it's not too late" to receive the benefits of the vaccine if a woman is already sexually active and that it is ideal to be vaccinated prior to initiating sexual activity. For the provider videos, a health care provider wearing a stethoscope, tells a story of having talked with her daughter, also

a college student, and that her daughter decided to get vaccinated. In the provider-and-peer exemplar videos, the health care provider testimonial is added to the peer exemplar dorm room re-enactment (see Appendices F-H for narrative scripts).

Stimulus Length

While the peer and the peer-and-provider conditions were comparable in length as measured both in number of words and minutes of running time (see Table 5.2) the provider-only condition was considerably shorter than the other two treatments because it did not contain reenactments due to limited access to the providers and presents a limitation to the study.

Table 5.2

Stimulus Length Measured in Number of Words and Time

Condition	Words	Time (minutes)
Peer	521	3.46; 3.39
Peer & Provider	556	4.11; 4.15
Provider	210	1.25

Measures

Identification with Media Characters. Sixteen items were used from Cohen (2001). Higher scores reflected greater identification. The items were adapted to ask about “exemplars in the video”. Sample items included: “I could easily place myself in the position of the exemplars,” “I tried to understand the exemplars in the video by imagining how things look from their perspective,” “The message seemed relevant to me,” “The idea of protecting myself against HPV is important,” “While watching the video I was thinking of someone I know.” (see Appendix M for complete list of items). A 7-point semantic differential scale anchored by 1 = *not at all descriptive* to 7 = *very descriptive* was used.

Narrative Transportation. An 8-item scale was taken from Green (2009) who revised and shortened the scale for film/video medium. The scale included 4 items assessing engagement with the narrative themes, two items assessing attention, and two items assessing mental imagery (e.g., picturing self in scenes of video). Sample items included “I could easily picture the events described taking place,” “I found myself wandering while watching the video“, “I was emotionally immersed while listening to the testimonials.”(see Appendix O for scale items) The scale was tested in a previous similar population—college students (Green et al., 2009). Respondents noted their level of agreement on a 7-point scale ranging from 1 = *not at all descriptive* to 7 = *very much* ($M = 4.73$, $SD = 1.14$, $\alpha = .73$).

Perceived Realism. A 5-item scale measuring realism was used from Elliott, Rudd, & Good (1983). Higher scores reflected greater realism. Sample items included: “The message was/was not authentic”, “The messages in the video seemed accurate/not accurate“, “The message had informational value.” (see Appendix P for scale items). The scale had been used in previous similar populations of college students using a 7-point semantic differential scale format ($M = 5.41$, $SD = .84$, $\alpha = .81$).

Vividness. A 4-item scale measuring the formal properties of the video intervention was taken from Herek (1998). Higher scores reflected greater vividness. This scale measured the perceived aesthetic quality of the video, the performance of the actors, and the audio quality of the narratives. Participants completed a 7-point semantic differential scale. Items included questions about the visual aesthetics of the video, the quality of the audio, and the interactivity of the video.

Data analysis

Preliminary data screening were conducted in SPSS 16.0 to examine the distributional, outlier, and missingness characteristics. Factor structure of each of the scales was then analyzed. The inter-item correlations of the scales, along with their means, standard deviations, and reliability were checked followed by confirmatory factor analyses of each scale. Finally, a full CFA measurement model of all factors was conducted to verify discriminant and convergent validity (*Mplus* 5.21 was used). Substantive analyses were then conducted to test the study hypotheses. Structural equation modeling (SEM) using robust maximum likelihood estimation (since some of the scales demonstrated significant skewness and kurtosis) was conducted to test the hypotheses.

Missing Data. Full information maximum likelihood (FIML) was used in *Mplus* 5.21 to handle missing data (Graham, Cumsille, & Elek-Fisk, 2003; Graham, 2009). This data had missingness however; it was less than 2%.

Dummy Coding of Video Interventions. Variables representing the three narrative-based video interventions were dummy coded to enable comparisons between treatments. The combined peer-and-provider video intervention was designated as the reference (see Table 5.3). Orthogonal comparisons were set up to compare peer-only and provider-only (Dummy coding 2, see column 2 in Table 5.3). A comparison of only two interventions at a time was performed to obviate the need for correcting experiment wise error (which would be necessary if all 3 interventions were compared). Second, to isolate narrative source effects, the peer-only was compared with the provider-only intervention. For parsimony, only the comparisons between peer-only and provider-only are reported in the present study.

Table 5.3

Dummy Coding to Compare Treatment Groups—Peer-and-Provider as Reference (N=251)

Group	Dummy1	Dummy2
Peer only	-1	+1
Provider only	-1	-1
Peer + Provider (Reference)	+2	0

Results

Reporting of results is organized into two sections. The first section reports on confirmatory factor analyses verifying convergent and discriminant validity of the scales used to measure the narrative mediators. The second section reports on the substantive analyses testing study hypotheses using structural equation modeling in *Mplus* 5.21.

Preliminary Analyses—The CFA Measurement Model

As a first step, a series of confirmatory factor analyses were conducted to verify the factor structures of each of the four narrative mediators used in the structural equation model. This analysis was followed by a full confirmatory factor analysis (CFA) model to verify convergent and discriminant validity of the scales. The following fit indices were used to determine goodness of fit: $\chi^2/df < 3.00$, CFI $> .95$, and RMSEA $< .06$ (Hu & Bentler, 1999).

Measurement Inspection

Four measures were inspected for their factor structure: identification with media characters, narrative transportation, vividness, and perceived realism. The following section reports on these results.

Identification with Media Characters. A second order 3-factor structure measured identification (Cohen, 2001). The three subscales consisted of empathy, internalizing the character's point of view, and typicality. Six items measured empathy, 6 items measured internalizing the characters' point of view, and 4 items measured the typicality of the media characters presented in the video. Sample items for empathy included: "While watching I was

involved in what the exemplars experienced”, “I experienced many of the same feelings that the exemplars expressed,” “I could easily place myself in the position of the exemplars,” “The exemplars in the video resonated with me.” Sample items of the internalization subscale included: “The message seemed relevant to me,” “The idea of protecting myself against HPV is important.” Sample items of the typicality subscale included: “The exemplars reminded me of a friend of mine,” “While watching the video I was thinking of someone I know.” Higher scores reflected stronger identification with media characters. Responses were averaged to form a composite scale ($M = 72.6$, $SD = 15.3$, $\alpha = .93$).

Goodness-of-fit indices for identification were as follows: $\chi^2 [102] = 166$, $p < .05$, $\chi^2/df = 1.63$, CFI = .973, RMSEA=.05, $p_{close} = .48$. The first order factor structure was compared to the second order factor structure. Goodness-of-fit indices were the same, hence, a chi square difference test for the Satorra Bentler scaled chi square was performed (see Table 5.4). Results for the Satorra Bentler scaled chi square difference test were not significant supporting the second order factor structure to fit equally well as the first order (Brown, 2006). Additional considerations for favoring the second order factor structure included that the second-order factor structure for identification was more parsimonious and the magnitude of the factor loadings for the second order structure were slightly higher than for the first order factor structure (Brown, 2006; Byrne, 2005).

Table 5.4

Fit Indices for Second Order Factor Structure of Identification with Media Characters (N = 250)

	SB- χ^2	df	CFI	RMSEA
1 Order	166.015	101	.973	.051
2 Order Nested	166.493	102	.973	.050
χ^2 difference	1.387	1	0.00	.001

Narrative Transportation was assessed using 4 items from Green's revised transportation scale for film (Green et al., 2009). The 4 items that measured transportation included: "I was emotionally immersed while listening to the testimonials", "I was involved in the dialogue", "I was mentally involved in the scenes" and "I remember most of what was said." Two reverse-coded items measuring attention and two items measuring imagery had to be removed from the scale given that they considerably lowered reliability. Confirmatory factor analyses on the remaining 4 items showed the following fit indices indicating adequate model fit: $\chi^2[2] = 11.2, p < .05, CFI = .97, RMSEA = .13$ ($M = 21.21, SD = 4.54, \alpha = .83$).

Perceived Realism was assessed using five items from Elliott's perceived realism scale (1983). Participants responded using a 7-point semantic differential (e.g., unrealistic-realistic). Sample items included: "The narratives in the video seemed not accurate/accurate", "The message was not authentic/authentic" and "The message had no/had informational value". Goodness-of-fit measures indicated a good fit: $\chi^2 [5] = 7.5, p < .18, CFI = .99, RMSEA = .04$ (See Appendix P for λ estimates). Responses were averaged to form a composite scale ($M = 30.8, SD = 4.5, \alpha = .89$).

Vividness was assessed using five items measuring the formal properties of the video narrative (Herek et al., 1998). Scale format was a 7-point differential scale ranging from 1= *not at all* to 7= *very much*. Item examples included "Hearing the exemplar's voices gave me a sense of being there," "I liked the visual quality of the video." Confirmatory factor analysis showed 1 factor consisting of 4 items with good fit: $\chi^2[2]= 5.6, p < .05, CFI = .99, RMSEA = .08, p_{close} = .18$. ($M = 23.6, SD = 4.4, \alpha = .88$).

HPV Vaccination Intent. The HPV vaccination intention scale consisted of two general HPV vaccination intention items (Fazekas et al., 2007): “I intend to get vaccinated for HPV” and “If the HPV vaccine were free, I would vaccinate for HPV”. Scale format consisted of a 4-point response scale ranging from 1= *definitely won't* to 4 = *definitely will*, ($M = 3.08$, $SD = .87$, $\alpha = .83$).

The full CFA measurement model fit the data acceptably: $SB-\chi^2 [716] = 716$, $p < .05$, $SB-\chi^2/df = 1.7$, $CFI = .94$, $RMSEA = .053$. As seen in Table 5.5, in the full CFA analysis, the factor loadings were all greater than .72. As seen in Table 5.6, inter-factor correlations were also moderately high between the 4 narrative mediators, which are conceptually related (with interfactor correlations greater than .58) while they correlated to a less extent with intent with the exception of identification. Finally, in the full CFA measurement model, correlations of all the factors' items were examined to verify discriminant validity (see Table 5.7).

Within factor items are expected to correlate with each other greater than .60 and with other non-factor items less than .50 (Brown, 2006). Examining the within-factor items and comparing with non-factor items, the rule generally held with the exception of a transportation item (trans8). This item demonstrated weaker within factor correlations ($r = .43$, $.45$) and correlated to a greater extent with some identification items ($r = .6$). Having removed the item initially, the factor showed overall significantly poorer fit hence it was added back into the scale. Thus, convergent and discriminant validity was demonstrated for all factors with the exception of the one transportation item (see full CFA measurement correlations in red in Table 5.7).

Table 5.5

Factor Loadings from the Full CFA Measurement Model

Items	Standardized Factor Loadings	Items	Standardized Factor Loadings
Transportation		Identification	
Trans1	.83	Emp1	.85
Trans2	.80	Emp2	.83
Trans3	.60	Emp3	.86
Trans4	.83	Emp4	.81
		Emp5	.87
Realism		Emp6	.89
Real1	.80	Pov1	.77
Real2	.79	Pov2	.75
Real3	.76	Pov3	.76
Real4	.72	Pov4	.81
Real5	.76	Pov5	.83
		Pov6	.85
Vividness		Typ1	.90
Vivid1	.85	Typ2	.90
Vivid2	.86	Typ3	.93
Vivid3	.79	Typ4	.89
Vivid4	.73		
Intent			
Intent1	.82		
Intent2	.89		

Note. All factor loadings were significant at $p < .000$.

Table 5.6
Interfactor Correlations of Narrative Mediators and Vaccine Intent (N=251)

	1	2	3	4	5
1. Identification	—				
2. Transportation	.80	—			
3. Realism	.71	.61	—		
4. Vividness	.62	.71	.58	—	
5. Vaccine Intent	.61	.29	.42	.23	—

Table 5.7

Inter-item Correlations of the Full CFA Measurement Model (Narrative Mediators and Vaccine Intent)

Items	Trans2	Trans5	Trans8	Trans9	Emp1	Emp4	Emp9	Emp10	Emp11	Emp19	POV1	POV2	POV4	POV5	POV6	POV7
Trans2	1.00															
Trans5	.666	1.00														
Trans8	.426	.450	1.00													
Trans9	.665	.674	.584	1.00												
Emp1	.609	.576	.385	.556	1.00											
Emp4	.483	.434	.264	.406	.705	1.00										
Emp9	.677	.568	.419	.550	.774	.697	1.00									
Emp10	.474	.452	.336	.407	.680	.717	.661	1.00								
Emp11	.506	.442	.321	.468	.728	.729	.725	.743	1.00							
Emp19	.607	.485	.341	.485	.741	.741	.781	.704	.796	1.00						
POV1	.437	.293	.261	.338	.430	.525	.470	.491	.533	.512	1.00					
POV2	.380	.214	.186	.246	.327	.358	.394	.334	.416	.454	.608	1.00				
POV4	.426	.345	.306	.383	.407	.385	.394	.343	.365	.468	.528	.600	1.00			
POV5	.413	.272	.216	.273	.396	.380	.406	.350	.432	.467	.560	.658	.676	1.00		
POV6	.465	.366	.268	.357	.454	.487	.477	.420	.405	.516	.640	.591	.658	.666	1.00	
POV7	.490	.386	.284	.358	.455	.497	.454	.390	.462	.533	.683	.612	.591	.719	.717	1.00
TYP1	.242	.337	.304	.343	.361	.250	.329	.275	.410	.338	.236	.211	.289	.321	.355	.294
TYP2	.257	.309	.275	.322	.314	.249	.305	.231	.337	.275	.218	.238	.307	.311	.330	.305
TYP3	.281	.341	.302	.347	.369	.258	.333	.279	.411	.317	.252	.235	.299	.329	.320	.328
TYP5	.285	.363	.243	.319	.431	.337	.382	.354	.414	.354	.244	.236	.281	.314	.315	.313
Real15	.450	.367	.350	.406	.331	.328	.369	.305	.308	.358	.428	.377	.490	.381	.408	.385
Real10	.423	.348	.252	.334	.326	.346	.316	.343	.337	.403	.445	.479	.476	.448	.505	.516
Real18	.341	.281	.233	.242	.239	.262	.244	.283	.225	.320	.365	.362	.437	.292	.327	.369
Real20	.300	.264	.329	.296	.284	.258	.259	.328	.226	.284	.349	.425	.448	.360	.381	.353
Real21	.527	.447	.367	.491	.478	.415	.454	.410	.411	.471	.447	.348	.517	.385	.427	.430
VIV9	.498	.420	.342	.494	.349	.325	.373	.313	.319	.372	.285	.273	.362	.316	.372	.334
VIV10	.496	.451	.365	.461	.384	.313	.368	.302	.329	.357	.285	.274	.395	.310	.313	.360

VIV11	.479	.456	.309	.445	.403	.336	.345	.252	.344	.353	.225	.243	.333	.298	.313	.347
VIV12	.517	.456	.423	.549	.437	.355	.429	.349	.433	.483	.256	.220	.324	.343	.318	.391
Intent3	.276	.170	.100	.137	.209	.368	.263	.311	.287	.313	.490	.371	.224	.339	.390	.446
Intent4	.265	.166	.165	.195	.226	.336	.241	.316	.287	.331	.510	.472	.309	.436	.439	.486

Table 5.7 - continued –

Inter-item Correlations of the Full CFA Measurement Model (Narrative Mediators and Vaccine Intent)

	TYP1	TYP2	TYP3	TYP5	Real15	Real10	Real18	Real20	Real21	VIV9	VIV10	VIV11	VIV12	Intent3	Intent4
TYP1	1.00														
TYP2	.804	1.00													
TYP3	.832	.854	1.00												
TYP5	.828	.802	.831	1.00											
Real15	.154	.328	.157	.167	1.00										
Real10	.151	.191	.152	.167	.615	1.00									
Real18	.091	.155	.099	.081	.600	.636	1.00								
Real20	.142	.054	.154	.146	.548	.563	.617	1.00							
Real21	.269	.129	.271	.270	.645	.538	.537	.520	1.00						
VIV9	.293	.279	.259	.267	.347	.415	.291	.352	.443	1.00					
VIV10	.287	.251	.294	.280	.331	.382	.263	.348	.448	.767	1.00				
VIV11	.283	.232	.281	.245	.375	.383	.290	.342	.418	.650	.681	1.00			
VIV12	.283	.200	.274	.258	.375	.384	.242	.346	.528	.595	.579	.609	1.00		
Intent3	.104	.115	.155	.139	.237	.377	.325	.196	.199	.150	.113	.080	.111	1.00	
Intent4	.159	.205	.244	.171	.214	.393	.393	.263	.213	.226	.195	.158	.178	.727	1.00

Substantive Analyses—Mediation Hypotheses

Having verified good fit of the full CFA measurement model, substantive analyses were examined next to answer the 5 hypotheses. Given the robust fit of the CFA measurement models, hypothesized relationships among the study variables were tested in a structural equation model (*Mplus* 5.21).

Hypothesis 1: Transportation as a Narrative Mediator

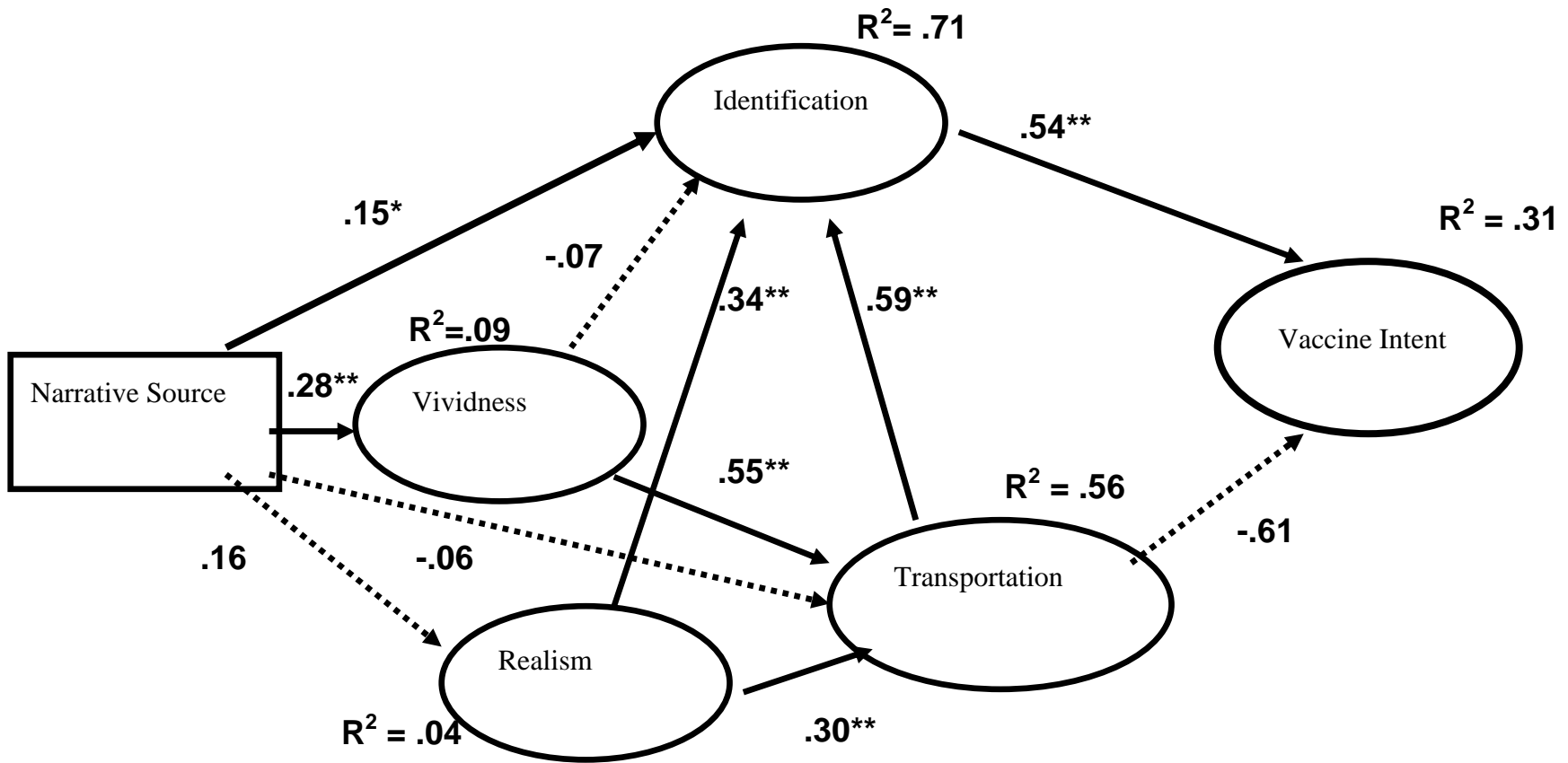
Hypothesis 1 tested whether transportation mediated the relationship between narrative source and HPV vaccine intent such that (H1a) college women are expected to be more transported by peer than by health care provider narratives (see Figure 5.2). The path coefficient between narrative source and transportation was not statistically significant. This was the case when comparing peer-only to provider-only (dummy code2: standardized $\gamma = -.064, p = .26$) and when comparing the reference of combined peer-provider with both peer-only or provider-only (dummy code1: standardized $\gamma = .008, p = .87$). Hypothesis 1b predicted that transportation would be positively associated with HPV vaccine intent. The path coefficient between transportation and intent was also not statistically significant (standardized $\gamma = -.612, p < .15$). Hypothesis 1, therefore, which tested whether the relationship between narrative source and HPV vaccine intent was mediated by transportation was not supported.

Hypothesis 2: Identification as a Narrative Mediator

Hypothesis 2 predicted that identification with media characters mediated the relationship between narrative source and HPV vaccine intent such that (H2a) college women are predicted to identify more with peer than with provider narratives. Peer narratives significantly increased identification compared to provider narratives (dummy code2: standardized $\gamma = .15, p = .023$).

Figure 5.2

A Model of Narrative Mediators and HPV Vaccine Intent
 (Narrative Source reflects Dummy Code2 comparing peer-only with provider-only)



There were no significant differences when comparing peer-and-provider with peer-only or provider-only (dummy code1: standardized $\gamma = .05, p = .31$). Hypothesis H2b predicted that identification was positively associated with HPV vaccine intent. Identification significantly increased HPV vaccine intent (standardized $\beta = .54, p < .000$). Hypothesis 2, addressing whether narrative source and HPV vaccine intent are mediated by identification was supported.

Hypothesis 3: The Relationship between Identification and Transportation

Hypothesis 3 postulated that transportation would be positively associated with identification such that (H3a) identification mediated the relationship between HPV vaccine intent and transportation. Transportation was positively associated with identification (standardized $\gamma = .59, p < .000$), and identification was positively associated with vaccine intent (standardized $\gamma = .54, p < .000$). Hypothesis 3 was supported.

Hypothesis 4: Vividness as Narrative Mediator

Hypothesis 4 tested whether vividness mediates the relationship between transportation and narrative source. Hypothesis 4a proposed that audiences would evaluate peer narratives as having greater vividness compared to provider narratives. Peer narratives significantly increased perceptions of vividness compared to provider narratives (dummy code2: standardized $\gamma = .28, p < .000$) and the combined peer-and-provider narratives were rated as significantly more vivid than peer-only or provider-only (dummy code1: standardized $\gamma = .197, p < .004$). Hypothesis 4b predicted that vividness would be positively associated with transportation. Vividness was significantly and positively associated with transportation (standardized $\gamma = .55, p < .000$). Finally, hypothesis 4c predicted that vividness would be positively associated with identification.

Increased vividness was not significantly associated with identification (standardized $\gamma = -.07$, $p = .538$). Thus, hypothesis 4 was partially supported.

Hypothesis 5: Perceived Realism as Narrative Mediator

Hypothesis 5 predicted that perceived realism mediates the relationship between narrative source and transportation such that (5a) peer narratives will be evaluated with increased realism compared to provider narratives. In turn, (5b) greater perceived realism would be positively associated with transportation. Finally, (5c) greater perceived realism would be positively associated with identification. Peer narratives were not evaluated as significantly more realistic than provider narratives although this finding was nearly significant with a p value of .054 (dummy code2: standardized $\gamma = .16$, $p = .054$). The combined peer-and-provider intervention was rated as significantly more realistic than either peer-only or provider-only intervention (dummy code1: standardized $\gamma = .15$, $p = .015$). Perceived realism was positively associated with transportation (standardized $\gamma = .30$, $p = .000$) and with identification (standardized $\gamma = .34$, $p = .000$). Overall however, realism did not significantly contribute to the model ($R^2 = .038$, $p = .20$). Hypothesis 5 was partially supported.

Overall Model Fit

Overall, the fit indices of the model met multiple criteria for goodness-of-fit and fit the data acceptably: $SB-\chi^2 [476] = 843.5$, $p < .05$, $SB-\chi^2/df = 1.7$, $CFI = .93$, $RMSEA = .05$. The model significantly explained 31% of variance in HPV vaccine intent. All of the variables significantly contributed to explained variance with the exception of perceived realism. Identification significantly accounted for 71%—the largest proportion of explained variance, followed by narrative transportation, which significantly accounted for 56% of explained variance, and vividness, which accounted for 9% of explained variance (see Table 5.8).

Table 5.8

Direct Effects from the Structural Equation Model including 4 Mediators

Parameter	Standardized Estimate
Vaccine Intent ON	
Identification	.54**
Transportation	-.61
Dummy1	.11
Dummy2	-.09
Identification ON	
Transportation	.64**
Realism	.34**
Vividness	-.07
Dummy1	.05
Dummy2	.15*
Transportation ON	
Vividness	.56**
Realism	.29**
Dummy1	.01
Dummy2	.06
Realism ON	
Dummy1	.15*
Dummy2	.16
Vividness ON	
Dummy1	.19**
Dummy2	.28**
R ² Vaccine Intent	.31**
R ² Identification	.71**
R ² Transportation	.56**
R ² Vividness	.09*

R² Realism

.04

Note. Dummy1 = Compared combined intervention with collapsed peer-only or provider-only.
 Dummy2 = Dummy coding of interventions, comparing peer-only with provider-only narratives.
 * $p < .05$ ** $p < .001$

The sum of the indirect paths was statistically significant but modest in strength of relationship; the sum of indirect path estimates for dummy code1 was .164, $p = .034$. while the sum of indirect path estimates for dummy code 2 was .30, $p < .01$. For dummy code1, which compared the combined intervention to peer-only or provider-only, only one path was statistically significant: Dummy1 \Rightarrow Vividness \Rightarrow Transport \Rightarrow Identification \Rightarrow Intent (standardized $\beta = .08^*$, $p = .04$; see Table 5.9). For dummy code 2, which compared peer-only with provider-only intervention, the two indirect paths that were statistically significant included the paths: Narrative source \Rightarrow Identification \Rightarrow Intent (standardized $\beta = .078$, $p < .024$) and Narrative source \Rightarrow Vividness \Rightarrow Transportation \Rightarrow Ident \Rightarrow Intent (standardized $\beta = .048$, $p < .009$) (see Figure 5.2; Table 5.9).

Table 5.9

Indirect Effects between Dummy Coded Intervention and Vaccine Intent

Parameter	Standardized Estimate
Dummy1 \Rightarrow Ident \Rightarrow Intent	.06
Dummy1 \Rightarrow Transport \Rightarrow Ident \Rightarrow Intent	.01
Dummy1 \Rightarrow Realism \Rightarrow Transport \Rightarrow Ident \Rightarrow Intent	.03
Dummy1 \Rightarrow Vividness \Rightarrow Transport \Rightarrow Ident \Rightarrow Intent	.08*
Dummy1 \Rightarrow Transport \Rightarrow Intent	.01
Dummy2 \Rightarrow Ident \Rightarrow Intent	.16*

Dummy2⇒Transport⇒Ident⇒Intent	-0.05
Dummy2⇒Realism ⇒Transport⇒ Ident⇒Intent	.03
Dummy2⇒Vividness ⇒Transport⇒Ident⇒Intent	.11*
Dummy2⇒Transport⇒Intent	.04

Note. Dummy1 = Compared combined intervention with collapsed peer-only or provider-only.

Dummy2 = Compares peer-only with provider-only narratives.

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

The global fit indices of the model indicated that the data mapped reasonably well onto the hypothesized model, i.e., that the postulated network of relations among the variables is plausible. Structural equation modeling extends a rigorous method to evaluate the validity of testing a substantive theory with empirical data. Furthermore, structural equation modeling allows the simultaneous testing of indirect as well as direct effects while controlling for biased estimates that occur with other methods such as path analysis.

While the chi square was statistically significant and this indicates poor model fit, chi square test statistic is sensitive to sample size and any model with greater than 200 cases will likely yield a significant result (Hu & Bentler, 1999; Kline, 1998). The root mean square error of approximation (RMSEA) of .05, which is based on the non-centrality parameter and is an absolute fit index, indicated good model fit (< .08 indicates good model fit). Absolute fit indices (in contrast to incremental fit indices) measure the extent to which the specified model reproduces the sample covariance matrix. Comparative fit indices (CFI), which is an incremental fit index, showed an acceptable fit of .93 (> .95 is desirable). In this study, the focus was on obtaining an acceptable fit and testing the intervention. While model comparisons were made, this was not the focus of the present study and further research will be conducted to extend rigorous model testing. Conceptually, the factors proposed in the model, which have been

hypothesized in past literature to play a role in narrative persuasion, manifested that they do indeed play a role given that their parameter estimates in large part were positive and in the expected direction. Practically, the model shows a relatively parsimonious model capturing longitudinal data and begins to capture and verify empirically causal mechanisms of narrative persuasion for health outcomes such as behavioral intent. R^2 were greater than .5 for the most part, which is desirable.

Discussion

The present study examined hypothesized causal mechanisms of narrative persuasion in order to advance narrative theory. Structural equation modeling allowed for directional, causal, and simultaneous modeling of multiple mediators including direct and indirect paths. The theory derived hypotheses testing narrative mechanisms were in large part supported. The following discussion highlights key findings with a focus on synthesizing the results of the five hypotheses.

Testing the Effects of Transportation

Hypothesis 1 and 3 tested the effects of transportation. The first hypothesis testing transportation's direct effects on HPV vaccine intent was not supported. However, hypothesis 3, which tested the indirect effects of transportation on HPV vaccine intent via identification was supported. Therefore, the present study sheds some light on transportation's indirect role in explaining how narratives increase behavioral intent. Psychological immersion into narratives (i.e., transportation) appears to play an important role, but only as a precursor of identification rather than directly impacting intent. This relationship to identification and indirect relationship to HPV vaccine intent is in fact, hypothesized by both culture-centric narrative theory (Larkey & Hecht, 2009) and by entertainment-education theories (Slater, 2002; Green, 2000). Overall, transportation significantly accounted for 56% explained variance in the present study's model of

narrative mechanisms ($R^2 = .56$) leading to the conclusion that transportation plays an important role in inducing intent through increasing identification with media characters.

Identification with Media Characters

The second hypothesis examining whether identification with media characters (i.e., exemplars) mediated the relationship between narrative source and HPV vaccine intent was supported. These results indicate that having audiences identify with the exemplars in a narrative increases vaccine intent. Having audiences process the HPV vaccine message from the exemplars' point of view (i.e., internalizing their point of view), feeling empathy for the exemplars, and seeing them as typical significantly explained how narratives imparted persuasion in the present study (accounting for 71% of explained variance, $R^2 = .71$). This finding extends the demonstration of exemplification effects to the health domain.

Hypothesis 2a, which compared peer and health care providers' ability to elicit identification, was also supported (peer narratives elicited greater identification than provider narratives). These results suggest that peers play a necessary role in effectively eliciting empathy (i.e., defined as identification in this study) while at the same time receiving medical information from the experts who may be less effective at eliciting empathy.

Vividness

The formal, technical qualities of a video narrative, defined in the present study as vividness, did not play a significant direct role in increasing identification but did play a significant role in increasing transportation, which in turn, increased identification. The formal properties of mediated narratives have been recognized as playing a critical role in prior studies (Green et al., 2009; Herek et al., 1998; Slater et al., 2006). However, vividness effects have never been integrated into a comprehensive model of narrative communication that takes multiple

narrative mediators into account simultaneously in explaining how they may influence behavioral intentions. Overall, vividness defined in the current study as the formal properties of the medium, accounted for 9% of explained variance.

Perceived Realism

Finally, hypothesis 5 examined the role of perceived realism, which has been acknowledged as important to explaining narrative effects in drama, cultivation, and aesthetic engagement theory. While perceived realism did not distinguish narrative types as defined in the current study (peer versus provider narratives), realism was positively and significantly associated with transportation and identification. These findings indicate that while narrative types in the current study were perceived as equally realistic, realism may still enhance overall narrative effectiveness.

Theoretical Implications

The present findings suggest a number of fruitful avenues for future research. According to the findings of the present study, having audiences identify with the exemplars plays a critical role in explaining peer narrative sources effects on vaccine intent. This study has taken a crucial step toward identifying but more importantly, empirically testing relevant mechanisms that explain how health narratives can function as a tool in public health campaigns that aim to increase behavioral intent. Structural equation modeling allowed for simultaneous modeling of multiple hypothesized narrative mediators to assess relative contributions of these narrative mediators. The present study shows that when the narrative source can successfully elicit empathy and referential reflection (i.e., identification as defined in the present study), narratives are more likely to have an impact on behavioral intent.

The current study's findings extended narrative theory, by (a) providing an integrated narrative communication model for health promotion, (b) testing theory derived relationships among four potential contributors of narrative processing using structural equation modeling, and (c) testing different types of narratives.

A Narrative Communication Model for Health Promotion

The present study examined how HPV vaccine narratives show promise for prompting college women to consider the HPV vaccine. While fictional entertainment narratives may function by suspending disbelief, health promotion narratives appear to primarily exert their influence through identification with the exemplars. Identification as defined in the present study includes eliciting empathy, internalizing the exemplars' point of view, and evaluating the exemplar as typical. These three components of identification played a critical role in moving audiences toward adopting an advocated behavior. Peers performed better than health care providers in eliciting empathy and having audiences internalize the exemplars' point of view. Increased identification (encompassing these 3 components) increased acceptance of the message, and thereby exerted narrative persuasion. Having vivid audiovisual narratives that transported the audience played important yet minor roles and were precursors to identification.

The proposed narrative communication model for health promotion presented here builds on and integrates prior models of narrative persuasion (Green, 2004; Larkey & Hecht, 2009; Moyer-Guse, 2008; Slater & Rouner, 2002). Further model testing is needed before a theory of narrative message design is proposed. A fundamental principle that is important for narrative message design rests in the assumption that the *process* of designing effective narratives builds on culturally grounded narratives in which target audience views are enlisted (Hecht & Krieger,

2006). This narrative design process will be critical to increasing message acceptance of any type of narrative.

Chapter Six

Discussion

I reiterate the dissertation goals here to preface discussions that ensue in this chapter: the two primary goals were first, to design an effective HPV vaccine intervention and second, to advance narrative communication theory for health promotion contexts including exemplification and culture-centric narrative theory.

Chapter Preview

This chapter, divided into three sections, focuses on discussing the theoretical, methodological, and practical implications of the present studies' findings. The first section is organized around (a) the formative findings and how these findings shed light on some previously unexplored aspects of HPV vaccination followed by (b) discussion of the intervention development process. The second section is organized around discussing the theoretical, methodological, and practical implications of implementing the randomized controlled trial testing the effects of narrative source and mediators of narrative processing. Discussion of the current research results is located within the larger body of research on narrative communication for health promotion contexts. Finally, in the third section, discussion centers on ethical considerations in health behavior campaigns, the idiosyncrasies of vaccination as a health behavior, and the implications for designing effective HPV vaccine campaigns.

Study One: Formative Research

Because HPV vaccination was a new health domain that was launched into the public health arena's consciousness at the start of this project, formative research was conducted to (a)

increase understanding of the main issues at stake around the topic of HPV vaccination, and (b) understand the issues that were relevant to college-aged women.

Content Discussion: What was learned from formative research?

Decision narratives were solicited from college women to increase understanding about the assumptions that underlie their decisions to resist or accept the HPV vaccine. The inquiry adopted a communication-centered perspective focusing on how college women ascribe meaning to the family, peer, and health care provider messages they receive.

The first major theoretical contribution advanced in this dissertation thus, is the characterization of HPV vaccine messages that uniquely speak to and reflect college women's perspectives. This area fills a gap in the existing HPV vaccine literature (which has predominantly focused on parental attitudes as they relate to having their adolescent daughters vaccinated) by increasing knowledge about college women's HPV perspectives and the messages they receive and interpret. To recapitulate (details are outlined in study one, chapter 3), messages unique to college-aged perspectives included the following themes (ordered here by how the findings were integrated into the video intervention):

1. Relationship status framed college women's thinking about HPV susceptibility.
2. Overcoming Self-Efficacy Barriers:
 - a. Increasing awareness that the HPV vaccine is available on campus
 - b. Finding the time to get vaccinated (3 times)
 - c. Cost of the vaccine
 - d. Fear of having to discuss the HPV vaccine with parents, i.e., discuss sex
3. Addressing perceived HPV vaccine harms.
 - a. Unknown long-term side effects, fear of short-term shot

4. Cues to action

- a. Dispelling myths: The belief that “it’s too late” for college women to benefit from HPV vaccination.
- b. Dispelling myths: If one is smart about sex, i.e., uses a condom, one does not need the HPV vaccine.
- c. Wanting to hear medical professionals endorse the HPV vaccine.

These narrative themes were directly incorporated into the intervention as a cultural grounding and culture-centric narrative approach would dictate (Hecht & Krieger, 2006; Larkey & Hecht, 2009). Integrating into the intervention how college women ascribe meaning to the peer, family, and health care provider messages they receive contributed toward presenting HPV vaccine messages as familiar and authentic.

While the specifics of formative research findings are reported in study one (chapter 3), I take the opportunity here to speak to broader communication themes that must be in place in order for public health campaigns like HPV vaccine campaigns to have an impact. Discussion includes two points: (1) In order for public health campaigns to have any chance of real impact health care providers must be on board and behind these efforts, and, (2) There is still much stigma around HPV and in order to advance HPV prevention efforts there is a need to normalize HPV by emphasizing that it is *very common*.

Health Professionals Must be on Board for a Public Health Campaign to Have Impact

One of several factors that seemed to impact HPV vaccine adoption was whether college-aged women had recently seen a health professional and whether the health professional explicitly recommended the vaccine. The range in messages that college women received from their health care providers was broad ranging from intense insistence that vaccination was

imperative to no or ambivalent messages about the HPV vaccine. It was clear however, that women who had vaccinated reported that their health care providers explicitly and emphatically recommended the HPV vaccine while those who had not vaccinated reported ambivalent or absent vaccine endorsement messages from health professionals.

College women's HPV vaccine decision narratives collected in study one indicated that college women looked to their health care providers for cues that the vaccine was necessary, safe, and recommended. While it would be assumed that all health care providers are on board with HPV vaccination, the college women interviewed as part of this project reported a range of provider messages. Recent literature indicates that a number of physicians do not initiate discussion about HPV vaccine because of its cost and the belief that relative to other health concerns it is not a top priority (Keating et al., 2008). If health care providers do not actively endorse HPV vaccination, public health efforts will be undermined. The implication of this finding is that health care provider messages play an important role for encouraging actual behavior change—HPV vaccination.

The Importance of Normalizing HPV Messages

College women's vaccine decision narratives revealed that stigma and negative messages associated with HPV exist especially among college-aged women. This emphasizes the need to normalize HPV messages to reduce HPV associated stigma. A way of normalizing HPV is by emphasizing its *extremely common prevalence among all people who are sexually active*, that many individuals are exposed to HPV without knowing, and have no symptoms. The important message for women to receive is to not be ashamed but rather to keep up to date with regular women's health visits, to follow up on sexual health just as one would follow up on general, physical health. There is thus, still significant work to be done to eliminate stigma and promote

greater prevention of sexually transmitted diseases. I turn now to a discussion of what was learned from the intervention development *process* and the different types of knowledge gained at various stages of the process (how it was learned) for developing an effective prevention campaign.

A Process Discussion: Stages of Learning in the Intervention Development Process

One of the goals of this dissertation was to develop an effective, theory-based HPV vaccine intervention. Cappella and Hornik (2009) define intervention as: “A way to step in between an initial set of conditions and an outcome to alter the outcome in a desired direction.” Thus, an intervention is an influence attempt. I take the opportunity here to share the knowledge uncovered in the development process and how this knowledge came about as it was uniquely tied to different stages of the development process.

A review of the intervention development process (visual diagram of the process is re-shown in Figure 6.1) provides critical stages at which different types of information were learned and integrated into the health message design process in an iterative manner.

Key learning points in the process (see Figure 6.1) included (a) collecting decision narratives that uniquely reflected college women’s perspectives and integrating these narratives into the intervention, (b) expert review, and (c) focus group feedback of the target audience (college women) on the prototype video. The *translation process* consisted of first identifying and ordering the narratives used in the video followed by expert and target audience feedback that impacted the ultimate shaping of the final intervention.

Collecting Decision Narratives

Eliciting decision narratives (rather than straight forward, traditional interviews) is better suited to uncovering implicit assumptions in attitudes related to HPV and the vaccine. A

challenge in formative research resides in successfully eliciting and bringing to light the often-tacit assumptions underlying attitudes about a health topic. Eliciting decision narratives was a deliberate methodological strategy employed to maximize the opportunity of unearthing implicit assumptions about HPV among college women. Having college women provide vaccine decision narratives tackled two challenges at once: first, women voiced the issues salient to them, which reveals an authentic audience perspective and does not impose pre-determined ideas; second, these narratives became the actual messages (i.e., supplying the content for the intervention) that were used in the video intervention aimed at reaching college-aged women.

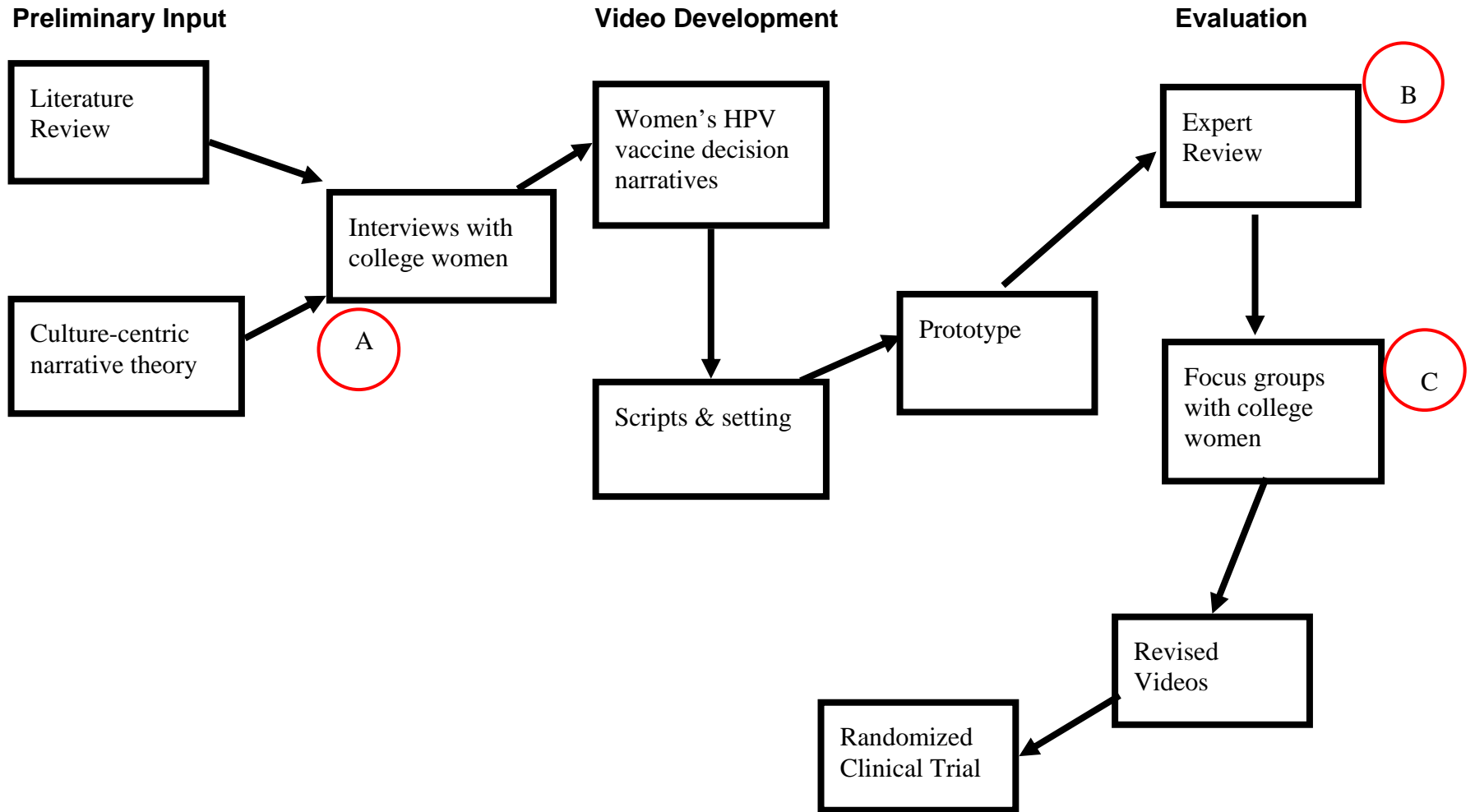
Gaining insight from attitudes about vaccine resistance was especially instructive. College women's decision narratives resisting HPV vaccination provided greater insight into the implicit assumptions underlying women's thinking processes about the vaccine. For example, reasons for not vaccinating uncovered erroneous beliefs that "it's too late" as well as articulated stigma that "HPV only affects those individuals who are not smart about sex". These messages exemplified some issues unique to college-aged populations and how vaccine messages need to be targeted to this age group.

Expert Feedback on Narrative Scripts

An external advisory panel provided feedback at two stages: first on the content of the narrative scripts (i.e., prior to the development of the videos) including the medical accuracy and then, once the pilot videos were produced, feedback was provided on the "look" of the video. Content feedback consisted of adjusting language to normalize and not further stigmatize HPV as well as making scenarios as "real" as possible. For example, the age of cancer onset in an exemplar was increased to 30 years old (which was older than the original, story).

Figure 6.1

INTERVENTION DEVELOPMENT PROCESS



Second, the “factual” messages about HPV were edited to emphasize that HPV is very common and that most individuals don’t know they have HPV because often they do not experience any symptoms. This change was made in an effort to avoid exacerbating potential stigma around HPV. Another change in content was to “be real about side effects”, and include an exemplar who had been vaccinated, having her acknowledge that she experienced side effects—that the shot could hurt and that one could have a soar arm for the rest of the day. Finally, messages were included to communicate that the vaccine protects against the four most common types of HPV but not all types. These changes were incorporated into the narratives used for the intervention. Feedback on the “look” of the intervention resulted in expanding the range of represented ethnicities providing narratives in the intervention. Two versions of the peer narratives were thus included, in which actors in the intervention represented a broader group of college women that included ethnic minorities.

College Women’s Feedback on the Produced Videos

In addition to experts’ feedback, the target audience’s (college women) feedback was sought on pilot videos in two focus groups comprised of 8 women in each group. This was a critical process component that contributed to the iterative development of the intervention. College women thus, provided the narrative content in the first stage, but equally important was the soliciting of college women’s reactions to videos. College women’s feedback on the videos consisted of four major comments: (1) that health professionals should be included in the video if a goal of the intervention was to have college women seriously listen to and act on the message, (2) that despite the recognition that family/parental messages may weigh heavily on college women’s vaccine attitudes, that parents should not be included in videos aimed at college-aged women, and (3) that college women liked, i.e., responded favorably to the tailored Penn State

background cues in the video (familiar background settings of campus, showing the actual student health center), and that (4) women liked the combination of “facts” and “narratives”. This feedback was incorporated into the intervention. In fact, narrative source became a central focal point of investigation given that there was a gap in the literature on narrative source and whether inclusion of expert sources reinforced and added credibility to peer messages or whether inclusion of expert/authority exemplars would result in reactance.

While the issue of having health professionals explicitly recommend HPV vaccination came up in in-depth interviews during formative research, this issue really hit home as important during focus groups when college women responded after watching the videos, that unless there were health professionals in the videos they would be less likely to seriously consider the message to vaccinate. Since behavior change was the major outcome goal of the intervention, inclusion of health professionals in the intervention became central. This second-stage feedback thus became a focal point of investigation by which narratives were varied (peer-only, provider-only, and combining peer and providers). The source literature had rarely combined peer and expert sources with most research contrasting one to the other. I turn now to discussing theoretical, methodological, and practical advances from implementing the randomized clinical intervention.

Study Two: Implementing a Randomized Controlled Trial

In establishing a program of research on (1) advancing narrative communication for health promotion and (2) advancing communication strategies for HPV vaccine message design, the second study in this dissertation focused on (a) examining narrative source effects, and (b) examining the relative influence of four narrative mediators. I review next the theoretical,

methodological, and practical contributions of the implemented intervention and the narrative mediator analyses locating study findings within the broader narrative communication literature.

Theoretical Advances

The second major theoretical contribution of this research (the first being the content identified that relates to college women's vaccine attitudes) is the recognition that narrative source plays a critical role in impacting HPV vaccine attitudes and behavior and therefore, has implications for narrative message design. *Narrative* source (operationalized as peer or expert) has received little attention in the existing narrative communication literature (Hinyard & Kreuter, 2007). Furthermore, of studies that have examined peer and expert source effects, few studies have combined source types to examine their effects. Consideration of narrative (exemplar) source effects contributes to and extends exemplification theory. Not only has the current research addressed this gap in the literature through theoretically based arguments, but it was demonstrated empirically, that combining peer and expert sources proved most effective in communicating HPV vaccine messages that resulted in increased HPV vaccination. Thus, the current research has (1) integrated the well-established communication construct of source for its critical role in narrative communication as it applies to designing vaccine messages, and, (2) shown that combining peer and expert sources may be optimal for influence attempts on behavior change outcomes.

Implications for prevention include the importance of initially investigating how audiences respond to the inclusion of experts. If audiences respond positively (no reactance), then combined expert and peer messages may operate optimally for greater messages acceptance. Whether inclusion of expert sources is critical for all health behaviors remains to be seen, but it appears to be a critical communication consideration in the design of promotional HPV vaccine

messages. Expert source types may only play an important communication role for (a) controversial health topics and (b) topics around which there is uncertainty and mixed media messages. Furthermore, the style in which expert sources communicate messages is another area for further research (e.g., avoiding the typical “you should...” messages that is common of expert sources). Peer sources on the other hand, appear to be positively evaluated across a much broader spectrum contingent upon peer messages resonating with audiences. To summarize results from study two’s first analysis (chapter 4) then, for HPV vaccination, combined peer and health care provider vaccine messages resulted in significantly increased vaccine efficacy, intent, and vaccination while peer-only and provider-only messages did not. I now turn to discussing a third theoretical contribution situated in the ongoing literature investigations namely, to gain greater insight into causal explanations for narrative effects.

As part of study two, a second series of analyses were conducted to examine mechanisms of narrative persuasion (chapter 5). These analyses spoke to an unanswered question that has been looming in the narrative communication literature—namely, now that prevention and health communication scholars recognize that narrative communication can exert persuasive effects on health behaviors, *how* does this happen. The findings from study two (chapter 5) of this project suggest that identification with peer exemplars plays a key role in explaining how narrative effects result in increased vaccine intentions among college women. Identification accounted for 71% of explained variance and mediated the relationship between narrative source and HPV vaccine intent. By contrast, narrative transportation (i.e., engagement) was important but only as a precursor to identification. Transportation accounted for 56% of explained variance in the narrative communication model. Surprisingly, perceived realism did not significantly contribute to the narrative communication model however, this may be due to the interventions being

perceived as equally realistic. Finally, vividness, which captured the delivery channel properties, accounted for a minor role of 9% in explained variance. Of note in the current research is that identification was defined not by perceived similarity but by having audiences experience and feel empathy for exemplars, understand the issue from the exemplar's point of view, and see them as typical of their social group.

Methodological Advances

The current research contributes methodological advances to existing narrative communication literature on several fronts. It demonstrates foremost the advantages of using of structural equation modeling, which allows for the simultaneous testing of multiple mediators including direct and indirect effects (as demonstrated in chapter 5). Most previous studies have been cross-sectional, used small sample sizes, and have used hypothetical scenarios rather than testing how narratives impact personal decision-making (Green, 2004; Larkey & Gonzalez, 2007; Murphy, 2009; Ubel, Jepson, & Baron, 2001). While past studies have made important contributions, the current studies extend knowledge about narrative source and causal narrative mechanisms of persuasion for how they relate to health outcomes. Multiple mediation with SEM allowed for clarifying how the hypothesized narrative mediators—identification, transportation, realism, and vividness—operate *while controlling for the other mediators in the model*.

Structural modeling allows the researcher to gain an understanding of the narrative mediators *relative* contributions in the hypothesized model of narrative communication for health promotion. Analyzing mediators one at a time results in biased parameter estimates, does not provide insight into the relative effects of mediators, nor does one have a sense of whether the hypothesized mediation model offers reasonable model fit. The current research advanced methodological contributions by testing hypothesized mechanisms longitudinally, and tested

narrative effects on behavioral outcomes (i.e., HPV vaccine uptake) as they relate to personal decision-making. Thus, the research extends understanding of narrative communication strategies specifically for how it relates to health promotion contexts (as opposed to media enjoyment contexts).

Practical Importance of the Study & Implications for Prevention

The current research is the first randomized clinical HPV vaccine intervention to be reported in the HPV vaccine literature and the first study to report positive, significant effects on behavioral outcomes, i.e., HPV vaccine uptake. Most studies to date have reported on HPV vaccine knowledge and attitudes (Brewer & Fazekas, 2007; Klug, Hukelmann, & Blettner, 2008). Testing intervention effects for behavioral outcomes has significant and important ramifications for public health advances. Effective communication strategies need to ultimately increase vaccine adoption if the public health HPV burden (measured by illness and health care dollars) is to be reduced. In the current research, participants exposed to the combined peer-and-expert intervention were twice as likely (22%) to vaccinate compared to controls (12%) and these differences were statistically significant.

Having a one-time video intervention positively impact HPV vaccine adoption shows tremendous promise for improving women's health regarding HPV infection. For the cost-conscious preventionist, the present study's intervention offers a low-cost, easy to implement intervention that shows significant promise for reducing HPV infection rates, reducing health care costs related to HPV infection, and reducing the incidence of cervical cancer. University health centers could easily and inexpensively implement such an intervention. Such narrative video interventions offer a pragmatic mechanism for delivering HPV prevention messages at a low cost. With even modest effects, the proposed intervention has the potential to significantly

reduce the incidence of HPV and related cervical cancer risk in up to at least 12,000 undergraduate female women attending one large northeastern university who are at risk for HPV. The intervention demonstrated not only a significant message, but also behavioral effects and could subsequently, be implemented at University Health Services. The impact on women's health has the potential to be enormous and low cost to implement.

Finally, the present study's findings offer practitioners guidelines for communicating about HPV and the vaccine. Practitioners can address whether (a) college women are aware that the vaccine is available on campus, (b) that many college women erroneously think it is too late for them to receive benefits from the HPV vaccine, (c) allay fears about vaccine side effects, (d) provide communication strategies for discussing the vaccine with parents, and (e) normalize HPV and reduce stigma.

Limitations

The current study is a preliminary step in gaining a richer understanding of the nuanced issues specific to HPV vaccine acceptance in college-aged populations (i.e., women). Further research is needed to design and disseminate effective HPV vaccine campaigns, which encompass culturally appropriate messages for populations at known high risk for cervical cancer and who historically, have had less access to Pap screens, to vaccines, and are in need of being specifically targeted. This need has already been documented as well as the fact that educational materials are inadequate with regards to effectively reaching these groups (Brandt et al., 2005; Davis, Williams, Marin, Parker, & Glass, 2002; Hunter, 2005; Lofters et al., 2007; Vanslyke et al., 2008). These populations include Latino, African-American, Vietnamese-American, and Appalachia women not only in the United States but especially in other countries where cervical cancer rates account for the second most common cancer death in women (Parkin

et al., 2005). Efficacy trials are needed to maximize the optimization and then disseminate campaigns aimed at these populations. Finally, the FDA approved and recommends the HPV vaccine in boys as of September 17th 2009. Clearly, vaccine messages will need to be framed differently for men, and frame disease prevention other than cervical cancer protection.

Study Strengths

Generalizability of study findings extends beyond the sample to the targeted population of college-aged women (age range 18-26) at the current study's university. Furthermore, generalizability of narrative effects extends only to the restrictive definition of narrative as operationalized in this study (i.e., prototypical college-aged vaccine narratives). The identified narrative themes in formative research significantly aided in rendering relevant vaccine messages for college-aged women. Narratives thus, facilitated the increase in HPV immunization acceptability, which was critical given that HPV vaccination, a volitional prevention step, is dependent on public acceptability.

Ethical considerations

Despite the potential benefits of narrative HPV and cancer prevention communication strategies, researchers must be ethically responsible when delivering HPV vaccine prevention narratives. Narrative effects have the potential for exerting "epidemiological misstatement" (Kreuter et al., 2007) providing technically correct information that can be misleading to audiences. For this reason, an expert panel advisory group reviewed the HPV vaccine intervention to ensure that from a medical standpoint, accurate information was implemented. Themes that were discussed included the importance of explaining that the vaccine only protects against four types of HPV (Bayer, 2005; Zimmermann, 2006), and that compliance with *three* doses of the vaccine are needed to ensure immunity protection. An ethical lens would indicate

the need to extend HPV vaccine campaigns to populations at highest risk for increased cervical cancer mortality, little access to Pap screening, and no means for affording the HPV vaccine (Latino, African-American, Vietnamese-American and Appalachia women). Future messages may also support the continued use of condoms for protection against other STIs and encourage the continued use of Pap screens. Future prevention efforts aimed at high-risk populations must ensure that these populations have the means to obtain HPV vaccination. For this reason, I am in discussions with Merck that if a campaign were marketed to reach at risk populations (e.g., Hispanic migrant women and men) who have no means of affording the vaccine, that Merck would facilitate providing the vaccine at no charge to those who meet eligibility requirements.

The Idiosyncrasies of HPV Vaccination

While on the one hand, research efforts are fruitful when knowledge gained can be inferred across a number of health domains, it is important to recognize the unique issues related to specific health domains. HPV vaccination has its own idiosyncrasies that trigger message reactions and understanding these unique attributes warrant attention for designing effective interventions. At the outset of this project HPV immunization was both new to the public and characterized by unique issues. HPV vaccination differs from other health behaviors in that it is a one-time behavior (unlike changing habits of exercising, nutrition, smoking cessation), the advocated health behavior involves injecting a substance into one's own body, which some privately fear, and, there is stigma associated with a diagnosis of HPV. Yet, given these idiosyncrasies of HPV vaccination, this health domain also offers a unique intervention opportunity given that effectiveness of this new cancer prevention paradigm rests largely with identifying effective communication strategies.

Future Research Directions

Fruitful directions for future prevention research rest in further investigating communication strategies for overcoming stigma associated with HPV, normalizing HPV messages, and coupling messages to increase STI prevention awareness and strategies while including HPV in the series. Thus narrative inquiry strategies may focus on how stigma may best be reduced.

Relatedly, cultural differences appear to play an important role in STI prevention in general and this includes HPV prevention. Therefore, it will be necessary to identify culture specific narratives to close the gap in health disparities. For example, a recent report has characterized Hispanic women as preferring condom use over vaccination yet these same women simultaneously voiced that their Hispanic male partners strongly resist condom use leaving Hispanic women vulnerable to HPV infection including other STIs (Vanslyke et al., 2008). Communication strategies will need to be developed to effectively reach specific cultures. While framing HPV vaccination as cancer prevention offers a strategy to avoid or minimize the stigma associated with HPV, among Hispanic cultures, cervical cancer connotes an equally stigmatizing message. Thus, solutions to these communication challenges remain in future prevention research efforts.

From an ethically minded perspective, underserved populations with known higher cervical cancer mortality should be prioritized in HPV vaccine prevention efforts. Having said this, women aged 18-26 are a medically indicated population at risk for HPV acquisition, and if college campus health centers provide an efficient delivery system that readily reaches a large number of women, these efforts should be continued given that it will significantly contribute to reduced HPV infection, related cancer, and health care costs.

Finally, given that the current research indicated that the inclusion of medical experts adds to HPV vaccine message acceptance among college-aged women, delivery styles of medical experts may need to be further investigated. Medical experts are typically expected to deliver didactic health messages, yet identifying effective “narrative” delivery modes for medical expert sources may yield fruitful results on how health professionals can increase message acceptance.

References

- Ache, K., & Wallace, L. S. (2008). Human papillomavirus vaccination coverage on Youtube. *American Journal of Preventive Medicine, 35*(4), 389-392.
- Adelswärd, V., & Sachs, L. (1996). The meaning of 6.8: Numeracy and normality in health information talks. *Social Science & Medicine, 43*(8), 1179-1187.
- Albarracin, D., Gillette, J. C., Earl, A. N., Glasman, L. R., Durantini, M. R., & Ho, M. H. (2005). A test of major assumptions about behavior change: a comprehensive look at the effects of passive and active HIV prevention interventions since the beginning of the epidemic. *Psychological Bulletin, 131*(6), 856-897.
- Allen, J. D., Mohllajee, A. P., Shelton, R. C., Othus, M. K. D., Fontenot, H., & Hanna, R. (2008). Stage of adoption of the human papillomavirus vaccine among college women. *Preventive Medicine, doi: 10.1016/j.ypmed.2008.12.005*.
- Allen, M., Bruflat, R., Fucilla, R., Kramer, M., McKellips, S., Ryan, D. J., et al. (2000). Testing the persuasiveness of evidence: combining narrative and statistical forms. *Communication Research Reports, 17*(4), 331-336.
- Andsager, J. L., Bemker, V., Choi, H. L., & Torwel, V. (2006). Perceived similarity of exemplar traits and behavior. *Communication Research, 33*(1), 3-18.
- Anhang, R., Goodman, A., & Goldie, S. (2004). HPV Communication: Review of existing research and recommendations for patient education. *CA A Cancer Journal for Clinicians, 54*, 248-259.
- Arnett, J. J. (1996). Sensation seeking, aggressiveness, and adolescent reckless behavior. *Personality and Individual Differences, 20*, 693-702.

- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55, 469-480.
- Aust, C. F., & Zillmann, D. (1996). Effects of victim exemplification in television news on viewer perception of social issues. *Journalism & Mass Communication Quarterly*, 73, 787-803.
- Babiste, I. (2001). Qualitative data analysis: Common phases, strategic differences. *Forum: Qualitative social research*, 2(3). Retrieved from <http://www.qualitative-research.net/fqs/fqs-eng.htm>
- Baessler, E. J., & Burgoon, J. K. (1994). The temporal effects of story and statistical evidence on belief change. *Communication Research*, 21(5), 582-602.
- Bandura, A. (1986). *Social foundations of thoughts and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Barth, K. R., Cook, R. L., Downs, J. S., Switzer, G. E., & Fischhoff, B. (2002). Social stigma and negative consequences: Factors that influence college students' decisions to seek testing for sexually transmitted infections. *Journal of American College Health*, 50(4), 153-159.
- Bayer, R. (2005). Module 6: Ethics of Health Promotion and Disease Prevention *Ethics & Public Health Module Curriculum* Retrieved September 6, 2005, from <http://www.asph.org/document.cfm?page=782>
- Berleant, A. (1991). *Art and engagement*. Philadelphia, PA: Temple University Press.
- Biocca, F. (2002). The evolution of interactive media: Toward being there in nonlinear worlds. In M. C. Green, J. J. Strange & T. C. Brock (Eds.), *Narrative impact: social and cognitive foundations*. Mahwah, NJ: Erlbaum.

- Boone, T. L., & Lefkowitz, E. S. (2004). Safer sex and the health belief model: Considering the contributions of peer norms and socialization factors. *Journal of Psychology & Human Sexuality, 16*(1), 51-68.
- Brandt, H. M., McCree, D. H., Lindley, L., Sharpe, P. A., & Hutto, B. E. (2005). An evaluation of printed HPV educational materials. *Cancer Control Journal, 12* (Supp 2), 103-106.
- Braverman, J. (2008). Testimonial versus informational persuasive messages. *Communication Research, 35*(5), 666-694.
- Brewer, N. T., Chapman, G. B., Gibbons, F. X., Gerrard, M., McCaul, K. D., & Weinstein, N. D. (2007). Meta-analysis of the relationship between risk perception and health behavior: The example of vaccination. *Health Psychology, 26*(2), 136-145.
- Brewer, N. T., & Fazekas, K. I. (2007). Predictors of HPV vaccine acceptability: A theory-informed, systematic review. *Preventive Medicine, 45*, 107-114.
- Brinson, S. L., & Brown, M. H. (1997). The AIDS risk narrative in the 1994 CDC campaign. *Journal of Health Communication, 2*, 101-112.
- Brosius, H. B. (1999). Research note: The influence of exemplification on recipients' judgments. *European journal of communication, 14*(2), 213-224.
- Brosius, H. B., & Bathelt, A. (1994). The utility of exemplars in persuasive communications. *Communication Research, 21*(1), 48-78.
- Brown, J. D., & Walsh-Childers, K. (2002). Effects of media on personal and public health. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (Vol. 453-488). Mahwah, NJ: Lawrence Erlbaum.
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford Press.

- Burchell, A. N., Winder, R. L., de Sanjose, S., & Franco, E. L. (2006). Epidemiology and transmission dynamics of genital HPV infection. *Vaccine, 24*, S52-61.
- Busselle, R., Ryabovolova, A., & Wilson, B. (2004). Ruining a good story: Cultivation, perceived realism, and narrative. *Communications 29*, 365-378.
- Busselle, R. W., & Shrum, L. J. (2003). Media exposure and exemplar accessibility. *Media Psychology, 5*, 255-282.
- Byrne, B. M. (2005). Factor analytic models: Viewing the structure of an assessment instrument from three perspectives. *Journal of Personality Assessment, 85*(1), 17-32.
- Campbell, D. T., & Stanley, J. C. (1966). *Experimental and quasi-experimental designs for research*. Palo Alto, CA: Houghton Mifflin Co.
- Cantor, J. R., Alfonso, H., & Zillmann, D. (1976). The persuasive effectiveness of the peer appeal and a communicator's first hand experience. *Communication Research, 3*, 293-310.
- Cappella, J., & Hornik, R. C. (2009). The importance of communication science in addressing core problems in public health. In D. Carbaugh & P. M. Buzzanell (Eds.), *Distinctive qualities in communication research*. New York, NY: Routledge.
- Caskey, R., Lindau, S. T., & Alexander, G. C. (2009). Knowledge and early adoption of the HPV vaccine among girls and young women: Results of a national survey. *Journal of Adolescent Health, 45*(5), 453-462.
- CDC (2002). *HPV Communication outreach* (No. 2001-Q-00133 [E-40]). Atlanta, GA: Centers for Disease Control & Prevention (CDC), Division of Sexually Transmitted Disease Prevention.

- CDC (2009). *United States Cancer Statistics: 1999-2005 Incidence and Mortality Web-based Report*. from Retrieved electronically on July 22, 2009 at <http://www.cdc.gov/cancer/cervical/statistics/race.htm>.
- Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought*. New York: Guilford Press.
- Chapman, G. B., & Coups, E. J. (1999). Predictors of influenza vaccine acceptance among healthy adults. *Preventive Medicine, 29*, 249-262.
- Christensen, P. N., Rothgerbert, H., Wood, W., & Matz, D. C. (2004). Social norms and identity relevance: A motivational approach to normative behavior *Personality and Social Psychology Bulletin, 30*, 1295-1309.
- Cialdini, R. B., & Reno, R. R. (1990). A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places *Journal of Personality and Social Psychology, 58*(6), 1015-1026.
- Cline, R. J. W., & Engel, J. L. (1991). College students' perception of sources of information about AIDS. *Journal of the American College of Health, 40*, 55-63.
- Cohen, J. (2001). Defining identification: A theoretical look at the identification of audiences with media characters. *Mass Communication and Society 4*, 245-264.
- Constantine, N. A., & Jerman, P. (2007). Acceptance of human papillomavirus vaccination among Californian parents of daughters: A representative statewide analysis. *Journal of Adolescent Health, 40*, 108-115.

- Crosby, R. A., Schoenberg, N. E., & Hopenhayn, C. (2007). Correlates of intent to be vaccinated against HPV: an exploratory study of college aged women. *Journal of Adolescent Health, 40*(2), S47-S47.
- Davis, T. C., Fredrickson, D. D., Kennen, E. M., Humiston, S. G., Arnold, C. L., Quinlin, M. S., et al. (2006). Vaccine risk/benefit communication: effect of an educational package for public health nurses. *Health Education & Behavior, 33*(6), 787-801.
- Davis, T. C., Williams, M. V., Marin, E., Parker, R. M., & Glass, J. (2002). Health literacy and cancer communication *CA A Cancer Journal for Clinicians, 52*(3), 134-149.
- Denzin, N. K. (2006). *Sociological methods: A sourcebook (5th edition)*. New Brunswick, NJ: Aldine Transaction.
- Downs, J. S., Bruine de Bruin, W., & Fischhoff, B. (2008). Parent' vaccination comprehension and decisions. *Vaccine, 26*, 1595-1607.
- Downs, J. S., Bruine de Bruin, W., Murray, P. J., & Fischhoff, B. (2006). Specific STI knowledge may be acquired too late. *Journal of Adolescent Health, 38*, 65-67.
- Downs, J. S., Murray, P. J., Bruine de Bruin, W., Penrose, J., Palmgren, C., & Fischhoff, B. (2004). Interactive video behavioral intervention to reduce adolescent females' STD risk: a randomized controlled trial. *Social Science & Medicine, 59*, 1561-1572.
- Dunne, E. F., Unger, E. R., Sternberg, M., McQuillan, G., Swan, D. C., Patel, S. S., et al. (2007). Prevalence of HPV infection among females in the United States. *Journal of American Medical Association (JAMA), 297*, 813-819.
- Elek, E., Miller-Day, M., & Hecht, M. L. (2006). Influences of personal, injunctive, and descriptive norms on early adolescent substance use. *Journal of Drug Issues, 36*(1), 147-172.

- Elliott, W. R., Rudd, R., & Good, L. (1983). *Measuring the perceived reality of television: Perceived plausibility, perceived superficiality, and the degree of personal utility*. Paper presented at the Association for Education in Journalism and Mass Communication, Corvallis, OR.
- Evans, A. E., Edmundson-Drane, E., Harris, K. K., & Campbell-Ray, T. (2002). A cervical cancer CD-ROM intervention for college age women: lessons learned from development and formative evaluation. *Health Promotion and Practice, 3*(4), 447-456.
- Fagerlin, A., Wang, C., & Ubel, P. A. (2005). Reducing the influence of anecdotal reasoning on people's health care decisions: Is a picture worth a thousand statistics? . *Medical Decision Making, 39*8-405.
- Fan, D. P. (2002). Impact of persuasive information on secular trends in health-related behavior. In R. Hornik (Ed.), *Public health communication* (pp. 251-264). Mahwah, NJ: Lawrence Earlbaum Associates.
- Fazekas, K. I., Brewer, N. T., & Smith, J. S. (2007). HPV vaccine acceptability in a rural, southern area. *Journal of Women's Health in press*.
- Fishbein, M., Hall-Jamieson, K., Zimmer, E., Von Haefen, I., & Nabi, R. (2002). Avoiding the boomerang effect: Testing the relative effectiveness of antidrug public service announcements before a national campaign *American Journal of Public Health, 92*, 238-245.
- Fisher, W. R. (1984). Narration as a human communication paradigm: The case of public moral argument. *Communication Monographs, 51*, 1-22.
- Fisher, W. R. (1985). The narrative paradigm: an elaboration. *Communication Monographs, 52*, 347-367.

- Fisher, W. R. (1987). *Human Communication as narration: Toward a philosophy of reason, value, and action*. Columbia: University of South Carolina Press.
- Fitch, K. L. (2003). Cultural Persuadables. *Communication Theory*, 13(1), 100-123.
- Franco, E. L., Bosch, F. X., Cuzick, J., Schiller, J. T., Garnett, G. P., Meheus, A., et al. (2006). Chapter 29: Knowledge gaps and priorities for research on prevention of HPV infection and cervical cancer. *Vaccine*, 24S3, 242-249.
- Friedman, A. L., & Sheppard, H. (2007). Exploring the knowledge, attitudes, beliefs, and communication preferences of the general public regarding HPV: findings from CDC focus group research and implications for practice. *Health Education & Behavior*, 34(3), 471-485.
- Gan, S., Hill, J. R., Pschernig, E., & Zillmann, D. (1996). The Hebron massacre, selective reports of Jewish reactions, and perceptions of volatility in Israel. *Journal of Broadcasting & Electronic Media*, 40, 122-131.
- Gerend, M. A., & Magloire, Z. F. (2007). Awareness, knowledge, and beliefs about human papillomavirus in a racially diverse sample of young adults. *Journal of Adolescent Health*, 42, 237-242.
- Gerrig, R. J. (1993). *Experiencing narrative worlds*. New Haven, CT: Yale University Press.
- Gerrig, R. J., & Prentice, D. A. (1996). Notes on audience response. In D. Bordwell & N. Carroll (Eds.), *Post-theory: Reconstructing film studies*. Madison, WI: The University of Wisconsin Press.
- Gibson, R., & Zillmann, D. (1993). The impact of quotation in news reports on issue perception. *Journalism Quarterly* 70(3), 793-800.

- Gibson, R., & Zillmann, D. (1994). Exaggerated versus representative exemplification in news reports: Perception of issues and personal consequences. *Communication Research*, 21(5), 603-624.
- Gibson, R., & Zillmann, D. (1998). Effects of citation in exemplifying testimony on issue perception. *Journalism & Mass Communication Quarterly*, 75(1), 167-176.
- Giles, H., & Street, R. L. (1985). Communicator Characteristics and Behavior. In M. L. Knapp & G. R. Miller (Eds.), *Handbook of Interpersonal Communication* (pp. 205-263). Beverly Hills, CA: SAGE.
- Graham, J. K., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data. In J. A. Shinka & W. F. Velicer (Eds.), *Comprehensive handbook of psychology: Vol. 2 Research methods in psychology* (pp. 87-114). New York Wiley.
- Graham, J. W. (2009). Missing Data Analysis: Making it work in the real world *Annual Review of Psychology*, 60, 549-576.
- Green, M. C. (2004). Transportation into narrative worlds: The role of prior knowledge and perceived realism. *Discourse Processes*, 38(2), 247-266.
- Green, M. C. (2006). Narratives and cancer communication *Journal of Communication* 56, S163-S183.
- Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79(5), 701-721.
- Green, M. C., Garst, J., Brock, T. C., & Chung, S. (2006). Fact versus fiction labeling: Persuasion parity despite heightened scrutiny of fact. *Media Psychology*, 8, 267-285.
- Green, M. C., Kass, S., Carrey, J., Herzig, B., Feeney, R., & Sabini, J. (2009). Transportation across media: text versus film. *Media Psychology*, in press.

- Greene, K., & Brinn, L. S. (2003). Messages influencing college women's tanning bed use: statistical versus narrative evidence format and a self-assessment to increase perceived susceptibility. *Journal of Health Communication* 8, 443-461.
- Greene, K., Campo, S., & Banerjee, S. (2006). *Comparing normative, anecdotal, and scientific risk evidence to discourage tanning bed use* Paper presented at the National Communication Association, San Antonio, TX.
- Gregg, J. L. (2003). *Virtually virgins: sexual strategies and cervical cancer in Recife, Brazil*. Stanford, CA: Stanford University Press.
- Guttman, N., Gesser-Edelsburg, A., & Israelashvili, M. (2008). The paradox of realism and authenticity in entertain-education: A study of adolescents' views about anti-drug abuse dramas. *Health Communication*, 23, 128-141.
- Haines, M. (1995). *Quick and practical needs assessment and evaluation for planning and protecting health promotion and disease prevention programs*. Paper presented at the American College of Health Association 75th Annual Meeting.
- Hall, A. (2003). Reading realism: audiences' evaluations of the reality of media texts. *Journal of Communication*, 53, 624-641.
- Hecht, M. L., Corman, S. R., & Miller-Rassulo, M. (1993). An evaluation of the drug resistance project: A comparison of film versus live performance media. *Health Communication*, 5(2), 75-88.
- Hecht, M. L., & Krieger, J. K. (2006). The principle of cultural grounding in school-based substance use prevention: The Drug Resistance Strategies Project. *Journal of Language and Social Psychology*, 25, 301-319.

- Hecht, M. L., & Miller-Day, M. (2009). Drug resistance strategies project: Using narrative theory to enhance adolescents' communication competence. In K. Cissna & L. Frey (Eds.), *Handbook of applied communication: exemplary programs*.
- Herek, G. M., Gillis, J. R., Glunt, E. K., Lewis, J., Welton, D., & Capitanio, J. P. (1998). Culturally sensitive AIDS educational videos for African American audiences: Effects of source, message, receiver, and context. *American Journal of Community Psychology*, 26(5), 705-743.
- Hinyard, L. J., & Kreuter, M. W. (2007). Using narrative communication as a tool for health behavior change: A conceptual, theoretical, and empirical overview *Health Education & Behavior*, 34(5), 777-792.
- Hopfer, S. (2009a). HPV vaccine decision narratives among college-aged women: Identifying determinants of HPV vaccine acceptability for vaccine adoption. *Health Communication*, under review.
- Hopfer, S. (2009b). Validation of a daughter-parent HPV vaccine communication scale. *Health Communication*, under review.
- Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and Persuasion* New Haven, CT: Yale University Press.
- Hu, L. T., & Bentler, P. (1999). Cutoff criteria for fit indices in covariance structure analysis: conventional criteria versus new alternatives *Structural equation modeling* 6, 1-55.
- Hunter, J. L. (2005). Cervical cancer educational pamphlets: Do they miss the mark for Mexican immigrant women's needs? *Cancer Control Journal*, 12 (Supp 2), 42-50.
- Iyengar, S. (1990). Framing responsibility for political issues: The case of poverty *Political Behavior*, 12, 19-40.

- Jackson, S., & Jacobs, S. (1983). Generalizing about messages: Suggestions for design and analysis of experiments. *Human Communication Research*, 9(2), 169-191.
- Jodlowski, D., Sharf, B. F., Nguyen, L. C., Haidet, P., & Woodard, L. D. (2007). Screwed for life: Examining identification and division in addiction narratives. *Communication & Medicine*, 4(1), 15-26.
- Kahn, J. A. (2005). *Adolescent decision-making and health behaviors: The influence of contextual factors on the use of new technologies to prevent HPV-related diseases*: National Research Council/Institute of Medicine, Board on Children, Youth, and Families.
- Kahn, J. A. (2007). Maximizing the potential public health impact of HPV vaccines: a focus on parents. *Journal of Adolescent Health*, 40, 101-103.
- Kahn, J. A., Rosenthal, S. L., Hamann, T., & Berstein, D. I. (2003). Attitudes about human papillomavirus vaccine in young women. *International Journal of STD & AIDS*, 14(5), 300-306.
- Kahn, J. A., Rosenthal, S. L., Jin, Y., Huang, B., Namakydoust, A., & Zimet, G. (2008). Rates of human papillomavirus vaccination, attitudes about vaccination, and human papillomavirus prevalence in young women. *American College of Obstetrics & Gynecology*, 111(5), 1103-1110.
- Kahn, J. A., Slap, G. B., Bernstein, D. I., Tissot, A., Kollar, L. M., Hillard, P. A., et al. (2007). Personal meaning of HPV and Pap test results in adolescents. *Journal of Adolescent Health*, 36(2), 130-130.

- Keating, K. M., Brewer, N. T., Gottlieb, S. L., Liddon, N., Ludema, C., & Smith, J. S. (2008). Potential barriers to HPV vaccine provision among medical practices in an area with high rates of cervical cancer. *Journal of Adolescent Health, 43*(4), S1-S68.
- Kelman, H. C., & Hovland, C. I. (1974). Attitude Change via Persuasive Communication: Source Characteristics. In S. Himmelfarb & A. H. Eagly (Eds.), *Readings in Attitude Change*. New York, NY: John Wiley & Sons.
- Kiene, S. M., & Barta, W. D. (2003). Personal narrative as a medium for STD/HIV intervention: A preliminary study. *Journal of Applied Social Psychology, 33*(11), 2327-2340.
- Kincaid, D. L. (2002). Drama, emotion, and cultural convergence. *Communication Theory, 12*, 136-152.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford.
- Klug, S. J., Hukelmann, M., & Blettner, M. (2008). Knowledge about infection with human papillomavirus: A systematic review. *Preventive Medicine, 46*, 87-98.
- Knobloch-Westerwick, S., & Keplinger, C. (2007). Thrilling news: factors generating suspense during news exposure. *Media Psychology, 9*, 193-210.
- Kreuter, M. W., Green, M. C., Cappella, J. N., Slater, M. D., Wise, M. E., Storey, D., et al. (2007). Narrative Communication in Cancer Prevention and Control: A framework to guide research and application *Annals of Behavioral Medicine, 33*(3), 221-235.
- Kreuter, M. W., & Wray, R. J. (2003). Tailored and target health communication: strategies for enhance information relevance. *American Journal of Health Behavior, 27*(Supp 3), S227-S232.

- Larkey, L. K., & Gonzalez, J. (2007). Storytelling for promoting colorectal cancer prevention and early detection among Latinos. *Patient Education and Counseling*, 67, 272-278.
- Larkey, L. K., & Hecht, M. L. (2009). A model of effects of narrative as culture centric-health promotion. *Journal of Health Communication*, in press(March).
- Larkey, L. K., Hecht, M. L., Slater, M. D., Helitzer, D., Kreuter, M. W., & Lopez, A. M. (2008). *A model of narrative as culture-centric health promotion*. Paper presented at the Society for Behavioral Medicine.
- LaSalle, L. (2008). PSU UHS Student Survey University Park, PA.
- Lather, P. (1991). *Getting smart: Feminist research and pedagogy with/in the Postmodern*. New York: Routledge.
- Latkin, C. A., Forman, V., Knowlton, A., & Sherman, S. (2003). Norms, social networks, and HIV-related risk behaviors among urban disadvantaged drug users. *Social Science & Medicine*, 56, 465-476.
- Lee, E., & Leets, L. (2002). Persuasive storytelling by hate groups online. *American Behavioral Scientist*, 45(6), 927-957.
- Lefkowitz, E. S., Boone, T. L., & Shearer, C. L. (2004). Communication with best friends about sex-related topics during emerging adulthood. *Journal of Youth and Adolescence*, 33(4), 339-351.
- Lefkowitz, E. S., & Espinosa-Hernandez, G. (2007). Sex-related communication with mothers and close friends during the transition to university *Journal of Sex Research*, 44(1), 17-27.
- Lincoln, Y., & Guba, E. (1985). *Naturalistic Inquiry*. New York: Sage.

- Lofters, A., Glazier, R. H., Agha, M. M., Creatore, M. I., & Moineddin, R. (2007). Inadequacy of cervical cancer screening among urban recent immigrants: A population-based study of physician and laboratory claims in Toronto, Canada. *Preventive Medicine, 44*, 536-542.
- Mackey, K., Arnold, M. L., & Pratt, M. W. (2001). Adolescents' stories of decision-making in more or less authoritarian families: representing the voices of parents in narrative. *Journal of Adolescent Research, 16*(3), 243-268.
- Maibach, E., & Parrott, R. L. (1995). *Designing Health Messages*. Thousand Oaks, CA: Sage.
- Mar, R. A. (2004). The neuropsychology of narrative: story comprehension, story production, and their interrelation *Neuropsychologica, 42*, 1414-1434.
- Markowitz, L. E., Dunne, E. F., Saraiya, M., Lawson, H. W., Chesson, H., & Unger, E. R. (2007). *MMWR: Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP)* Atlanta: Center for Disease Control (CDC) Department of Health and Human Services (DHHS).
- Marteau, T. M., & Lerman, C. (2002). Genetic risk and behavioral change. *British Medical Journal 322*, 1056-1059.
- Mayer, R. E., Fennell, S., Farmer, L., & Campbell, J. (2004). A personalization effect in multimedia learning: students learn better when words are in conversational style rather than formal style. *Journal of Educational Psychology, 96*(2), 389-395.
- McAdams, D. P. (1993). *The stories we live by: Personal myths and the making of the self*. New York: Morrow.
- McCree, D. H., Sharpe, P. A., Brandt, H. M., & Robertson, R. (2006). Preferences for sources of information about abnormal Pap tests and HPV in women tested for HPV *Preventive Medicine, 43*, 165-170.

- McDivitt, J. A. (1997). Explaining the impact of a communication campaign to change vaccination knowledge and coverage in the Philippines *Health Communication, 9*(2), 95-118.
- McGuire, W. J. (1985). Attitudes and attitude change. In G. Lindzey & E. Aronson (Eds.), *Handbook on social psychology*. New York: Random House.
- McLean, K. C. (2005). Late adolescent identity development: Narrative meaning making and memory telling. *Developmental Psychology, 41*(4), 683-691.
- McRee, A., Brewer, N. T., Smith, J. S., Reiter, P. L., & Gottlieb, S. (2009). *Carolina HPV Immunization Scale (CHIAS)*. Paper presented at the Society for Behavioral Medicine
- Mellanby, A. R., Rees, J. B., & Tripp, J. H. (2000). Peer-led and adult-led school health education: a critical review of available comparative research. *Health Education Research, 15*(5), 533-545.
- Miller, M., Hecht, M. L., & Stiff, J. (1998). An exploratory measurement of engagement with live and film media. *Journal of the Illinois Speech and Theatre Association, 49*, 69-83.
- Miller-Day, M. (1998). The qualitative research journey: How did I get here and where am I going? In M. Miller-Day (Ed.), *Communication among grandmothers, mothers, and adult daughters: A qualitative study of maternal relationships*. Mahwah, New Jersey: Routledge.
- Miller-Day, M. (2008a). Talking to youth about drugs: What do late adolescents say about parental strategies? *Family Relations, 57*, 1-12.
- Miller-Day, M. (2008b). Translational Performances: Toward relevant, engaging, and empowering social science. *Forum: Qualitative social research, 9*(2), Art. 54.

- Moyer-Guse, E. (2008). Toward a theory of entertainment persuasion: Explaining the persuasive effects of entertainment education messages. *Communication Theory, 18*, 407-425.
- Moyer-Guse, E., & Nabi, R. (2008). *Explaining the persuasive effects of entertainment education programming: an empirical comparison of three theories*. Paper presented at the National Communication Association.
- Murphy, S. (2009). *Involved, transported, or emotional? Exploring the determinants of change in knowledge, attitudes, and behavior in entertainment education*. Paper presented at the International Communication Association Conference.
- Muthen, L. K., & Muthen, B. O. (2007). *Mplus User's Guide*. Fifth edition. . Los Angeles, CA.
- NCI (2007). from <http://women.cancer.gov/research/cervical.shtml>.
- Nelson, A., & Arthur, B. (2003). Storytelling for empowerment: Decreasing at-risk youth's alcohol and marijuana use. *The Journal of Primary Prevention, 24*(2), 169-180.
- Nisbett, R., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgement* New Jersey: Prentice Hall.
- O'Donoghue, T., & Punch, K. (2003). *Qualitative education research in actions: Doing and reflecting*: Routledge.
- Ogilvie, G. S., Remple, V. P., Marra, F., McNeil, S. A., Naus, M., Pielak, K. L., et al. (2007). Parental intention to have daughters receive the human papillomavirus vaccine. *Canadian Medical Association Journal, 177*(12), 1506-1512.
- Parkin, D. M., Bray, F., Ferlay, J., & Pisani, P. (2005). Global cancer statistics, 2002. *CA A Cancer Journal for Clinicians, 55*(2), 74-108.
- Pennington, N., & Hastie, R. (1992). Explaining the evidence: Tests of the story model for juror decision making. *Journal of Personality and Social Psychology 62*(2), 189-206.

- Pennington, N., & Hastie, R. (1993). A theory of explanation-based decision making. In G. Klein, J. Orasanu, R. Calderwood & C. E. Zsombok (Eds.), *Decision making in action: Models and methods* Norwood, NJ: Ablex.
- Perry, S. D., & Gonzenbach, W. J. (1997). Effects of news exemplification extended: Consideration of controversiality and perceived future opinion. *Journal of Broadcasting and Electronic Media*, 41, 229-244.
- Petraglia, J. (2009). The importance of being authentic: Persuasion, narration, and dialogue in health communication and education. *Health Communication*, 24, 176-185.
- Petronio, S. (2007). JACR commentaries on translating research into practice: Introduction. *Journal of Applied Communication Research*, 35(3), 215-217.
- Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches* Dubuque, IA: Wm. C. Brown.
- Reimer, T., Mata, R., & Stoecklin, M. (2004). The use of heuristics in persuasion: deriving cues on source expertise from argument quality. *Current research in social psychology*, 10(6), 69-84.
- Rhodes, T., & Cusick, L. (2002). Accounting for unprotected sex: stories of agency and acceptability. *Social Science & Medicine*, 55, 211-226.
- Richardson, J., Owen-Smith, V., & Howe, A. (2002). The effect of 'Alma's' death on women attending for a cervical cancer smear: a quest. *Journal of Public Health Medicine*, 24(4), 305-306.
- Riessman, C. K. (2008). *Narrative methods for the human sciences*. Thousand Oaks, CA: Sage.
- Riley, T., & Hawe, P. (2005). Researching practice: the methodological case for narrative inquiry. *Health Education Research*, 20(2), 226-236.

- Rodewald, L. E., & Orenstein, W. A. (2009). Vaccinating adolescents-new evidence of challenges and opportunities. *Journal of Adolescent Health, 45*(5), 427-429.
- Rouner, D., & Lindsey, R. (2006). Female adolescent communication about sexually transmitted diseases. *Health Communication, 19*(1), 29-38.
- Sales, M. J., Milhausen, R. R., Wingwood, G. M., DiClimente, R. J., Salazar, L. F., & Crosby, R. A. (2008). Validation of a parent-adolescent communication scale for use in STD/HIV prevention interventions. *Health Education & Behavior, 35*(3), 332-345.
- Sanfey, A., & Hastie, R. (1998). Does evidence presentation format affect judgment?: An experimental evaluation of displays of data for judgments. *Psychological Science, 9*(2), 99-103.
- Schwandt, T. (2001). *Dictionary of Qualitative Inquiry, 2nd edition*. Thousand Oak, CA: SAGE
- Sevon, E. (2005). Timing motherhood: Experiencing and narrating the choice to become a mother. *Feminism & Psychology, 15*(4), 461-482.
- Sheeran, P., & Orbell, S. (1999). Augmenting the theory of planned behavior: Roles for anticipated regret and descriptive norms. *Journal of Applied Social Psychology, 29*(10), 2107-2142.
- Sherris, J., Friedman, A., Wittet, S., Davies, P., Steben, M., & Saraiya, M. (2006). Chapter 25: Education, training, and communication for HPV vaccines. *Vaccine, 24S3*, 210-218.
- Sjoborg, K., & Eskild, A. (2009). Vaccination against human papillomavirus-an impact on preterm delivery? Estimations based on a literature review. *Acta Obstetrica et Gynecologica Scandinavica 86*(9), 1027-1028.

- Slater, M. D. (2002). Entertainment education and the persuasive impact of narratives. In M. C. Green, J. J. Strange & T. C. Brock (Eds.), *Narrative impact: Social and cognitive foundations* (pp. 157-181). Mahwah, N.J.: Lawrence Erlbaum.
- Slater, M. D., Buller, D. B., Waters, E., Archibeque, M., & LeBlanc, M. (2003). A test of conversational and testimonial messages versus didactic presentations of nutrition information. *Journal of Nutrition Education & Behavior, 35*(5), 255-259.
- Slater, M. D., & Rouner, D. (2002). Entertainment-education and elaboration likelihood: Understanding the processing of narrative persuasion. *Communication Theory, 12*(2), 173-191.
- Slater, M. D., Rouner, D., & Long, M. (2006). Television dramas and support for controversial public policies: effects and mechanisms. *Journal of Communication, 56*, 235-252.
- Smith, J. S., Melendy, A., Rana, R. K., & Pimenta, J. M. (2008). Age-specific prevalence of infection with human papillomavirus in females: a global review. *Journal of Adolescent Health, 43*(4 S1), S5.e1-S5.e262.
- Smith, R. A., Downs, E., & Witte, K. (2007). Drama theory and entertainment education: Exploring the effects of a radio drama on behavioral intentions to limit HIV transmission in Ethiopia. *Communication Monographs, 74*(2), 133-153.
- Smith, S. M., & Shaffer, D. R. (2000). Vividness can undermine or enhance message processing: The moderating role of vividness congruency. *Personality and Social Psychology Bulletin, 26*(7), 769-779.
- Snyder, L., & Hamilton, M. A. (2002). A meta-analysis of U.S. health campaign effects on behavior: Emphasize enforcement, exposure, and new information and beware the secular

- trend. In R. C. Hornik (Ed.), *Public health communication: Evidence for behavior change* (pp. 357-382). Mahwah, NJ: Erlbaum.
- Sood, S. (2002). Audience involvement and entertainment-education. *Communication Theory*, 12(2), 153-172.
- Strange, J. J., & Leung, C. C. (1999). How anecdotal accounts in news and in fiction can influence judgments of a social problem's urgency, causes, and cures. *Society for Personality and Social Psychology* 25(4), 436-449.
- Sundar, S. S. (2003). News features and learning. In J. Bryant, D. Roskos-Ewoldsen & J. Cantor (Eds.), *Communication and Emotion: Essays in honor of Dolf Zillmann* (pp. 275-296). Mahwah, NJ: Lawrence Erlbaum Associates
- Sundar, S. S. (2007). Technology and Credibility: Cognitive heuristics cues by modality, agency, interactivity, and navigability. In M. J. Metzger & A. J. Flanagin (Eds.), *Digital Media, Youth, and Credibility: MacArthur Foundation Series on Digital Media and Learning*.
- Sundar, S. S., Xu, Q., & Oeldorf-Hirsch, A. (2009). *Authority vs. peer: How interface cues influence users*. Paper presented at the Proceedings of the conference on human factors in computing systems (ACM SIGCHI).
- Taylor, S. E., & Thompson, S. C. (1982). Stalking the elusive "vividness" effect. *Psychological Review*, 89(2), 155-181.
- Telford, R., & Rogers, A. (2003). What influences elderly peoples' decisions about whether to accept the influenza vaccination? A qualitative study *Health Education Research* 18(6), 743-753.
- Ubel, P. A., Jepson, C., & Baron, J. (2001). The inclusion of patient testimonials in decision aids: Effects of treatment choices. *Medical Decision Making* 21, 60-68.

- Vanslyke, J. G., Baum, J., Plaza, V., Otero, M., Wheeler, C., & Helitzer, D. (2008). HPV and cervical cancer testing and prevention: Knowledge, beliefs, and attitudes among Hispanic women. *Qualitative Health Research, 18*(5), 584-596.
- Walboomers, J. M. M., Jacobs, M. V., Manos, M. M., Bosch, F. X., Kummer, J. A., Shah, K. V., et al. (1999). Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. *Journal of Pathology, 189*, 12-19.
- Wang, A. (2008). Consensus and disagreement between online peer and expert recommendations. *International journal of internet marketing and advertising, 4*(4), 328-349.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268.
- Wetzel, C., Tissot, A., Kollar, L. M., Hillard, P. A., Stone, R., & Kahn, J. A. (2007). Development of an HPV educational protocol for adolescents. *Journal of Pediatric Gynecology, 20*, 281-287.
- White, H. (1981). The value of narrativity in the presentation of reality. In W. J. T. Mitchell (Ed.), *On Narrative*. Chicago: University of Chicago Press.
- White, S., Park, Y. S., Israel, T., & Cordero, E. D. (2009). Longitudinal evaluation of peer health education on a college campus: Impact on health behaviors. *Journal of the American College of Health, 57*(5), 497-506.
- Wright, T. C., Bosch, F. X., Franco, E. L., Cuzick, J., Schiller, J. T., Garnett, G. P., et al. (2006). Chapter 30: HPV vaccines and screening in the prevention of cervical cancer; conclusions from a 2006 workshop of international experts. *Vaccine, 24S3*, 251-261.

- Young, S. (2009, September 12, 2009). FDA panel urges HPV vaccine be given to boys. *CNN*.
- Zillmann, D. (1994). Mechanisms of emotional involvement with drama. *Poetics*, 23, 33-51.
- Zillmann, D. (1999). Exemplification theory: judging the whole by the some of its parts. *Media Psychology*, 1, 69-94.
- Zillmann, D. (2002). Exemplification theory of media influence. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (pp. 19-41). Mahwah, NJ: Erlbaum.
- Zillmann, D. (2006). Exemplification effects in the promotion of safety and health. *Journal of Communication* 56(Supplement), 221-237.
- Zillmann, D., & Brosius, H. B. (2000). *Exemplification in Communication: The influence of case reports on the perception of issues*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Zillmann, D., & Gan, S. (1996). Effects of threatening images in news programs on the perception of risk to others and self. *Medienpsychologie*, 4, 123-134.
- Zillmann, D., Gibson, R., Sundar, S. S., & Perkins, J. W. (1996). Effects of exemplification on news reports on the perception of social issues. *Journalism & Mass Communication Quarterly*, 73(2), 427-444.
- Zillmann, D., & Knobloch, S. (2001). Emotional reactions to narratives about the fortunes of personae in the news theater. *Poetics*, 29, 189-206.
- Zillmann, D., Perkins, J. W., & Sundar, S. S. (1992). Impression formation effects of printed news varying in descriptive precision and exemplification *Medienpsychologie: Zeitschrift für Individual- und Massenkommunikation*, 4, 168-185.
- Zimet, G. D., Kahn, J. A., & Shew, M. L. (2008). Appropriate Use of Cervical Cancer Vaccine. *Annual Review of Medicine*, 59, 223-236.

Zimet, G. D., Liddon, N., Rosenthal, S. L., Lazcano-Ponce, E., & Allen, B. (2006). Chapter 26: Psychosocial aspects of vaccine acceptability *Vaccine*, *24S3*, 201-209.

Zimet, G. D., Mays, R. M., Winston, Y., Kee, R., Dickes, J., & Su, L. (2000). Acceptability of human papillomavirus immunization. *Journal of Women's Health & Gender-based medicine*, *9*(1), 47-50.

Zimmermann, R. K. (2006). Ethical analysis of HPV vaccine policy options. *Vaccine*, *24*, 4812-4820.

Appendix A
Interview Guide
(College Women)

Interview Guide to Interview College Women about their HPV Vaccine Attitudes and Decisions

Purpose of Interview:

- (1) Identify assumptions underlying college women's decisions to accept or resist the human papillomavirus (HPV) vaccine.
- (2) Explore health care provider, family, and peer messages that college women report receiving about HPV vaccination
- (3) Explore what college women believe influence their HPV vaccine attitudes and decisions the most.

HPV VACCINE DECISION NARRATIVES

If participants answered YES to screening question #2 (whether they have had the HPV vaccine) begin with the following open-ended question:

“Let’s talk a little bit about your decision to get the HPV vaccine. Will you tell me about how that came about?”

Probes: “How did you go about deciding?” “How did that come about?”
 “Did you talk with anyone before deciding?”

If participants answered NO to screening question #2 (that they have not received the HPV vaccine) then begin with the following open-ended question:

“Let’s say your health care provider mentioned something about the HPV vaccine to you. How do you think that conversation might go? Try to include the sorts of things you might think to yourself as you were talking with this person.”

Probes: “Do you think you would talk to anyone before deciding?”
 “If yes, who would that be and please tell me how you think that conversation might go, including what you might be thinking”

FOLLOW UP PROBES:

HEALTH CARE PROVIDER MESSAGES ABOUT HPV VACCINATION

“Did your health care provider talk to you about the HPV vaccine?”

“What did they say?” “What do you think about what they said?”

FAMILY MESSAGES ABOUT HPV VACCINATION

PARENTAL INJUNCTIVE MESSAGES

“Have you talked with your parents about the HPV vaccine?” If no, “Why not?”

If yes, “What did they say? What are their opinions about the HPV vaccine?”

SIBLING MESSAGES

“Do you have sisters? “Have you talked with your sisters about the HPV vaccine?”

If no, “Why not?” If yes, “What did you talk about?”

PEER MESSAGES ABOUT HPV VACCINATION

GIRLFRIENDS/ROOMMATES

“Have you discussed HPV vaccination with your girlfriends or roommates?”

If yes, “What did you talk about?” “How did the subject come up in discussion?”

“When talking with your girlfriends, what reasons did they give for why they got the HPV vaccine or why they didn’t?” What do you think about that?

BOYFRIENDS/PARTNERS

“Has HPV vaccination ever come up in discussion with your boyfriend or partner?”

If yes, “What did you talk about?” “How or why did it come up?” “How did what they said make you feel?”

PERSONAL NORMS ABOUT HPV VACCINATION

“What are your personal thoughts about whether women should get the HPV vaccine?”

“Do you think your girlfriends, sister should get the HPV vaccine?” “Women in general?” “Men in general?”

“What are your beliefs about the consequences of getting or not getting the HPV vaccine?”

“Any drawbacks to not getting the vaccine?”

Probe: “In your opinion, what are some reasons for getting vaccinated for HPV?”

Probe: “In your opinion, what are some reasons not to get vaccinated for HPV?”

Probe: “Which of the mentioned reasons do you think influence you the most in your decisions?”

PERCEPTIONS OF HPV SUSCEPTIBILITY

“What would make you feel vulnerable to acquiring HPV?”

If nothing, “Why is that?” “What would make you feel at risk for HPV acquisition?”

If yes, “Tell me more about how and why you feel vulnerable for acquiring HPV?”

Appendix B

Pre-Interview Questionnaire

(College Women)

*Screening Questionnaire Prior to In-depth Interview with College Women***PARTICIPANT INCLUSION CRITERIA:**

- (1) Are you between the ages of 18 and 26?
- (2) Have you received the HPV vaccine?
- (3) Are you comfortable discussing your sexual history including Pap screening practices, sexual behavior, and your sexual attitudes?

HPV KNOWLEDGE

Please respond with true (T) or false (F) to the following questions 1a-g.

- (1) Have you ever heard of the HPV vaccine? If yes, what source?
 - (a) A person usually has symptoms when infected with HPV
 - (b) A person's chance of getting HPV increases with the number of sexual partners they have
 - (c) A person can get HPV from one sexual intercourse encounter
 - (d) Most types of HPV cannot clear up on their own
 - (e) Certain types of HPV can lead to cervical cancer
 - (f) HPV can cause genital warts
 - (g) An abnormal Pap test may indicate an HPV infection

SEXUAL ACTIVITY

(2) In what follows are some questions related to your sexually activity.

Please mark the statement below which best reflects what is true for you at this time.

I am sexually active at this time.

I am not currently sexually active but have been in the past 12 months.

I am not currently sexually active but plan to be in the future.

(3) If you are sexually active, how would you describe your relationship status at the present time? Committed or Casual

(4) How often were condoms used during penetrative sex with a current and/or previous partner in the last 12 months? Penetrative sex is defined as sex in which the penis penetrates the vagina or anus.

never

less than half the time

more than half the time

every time with every partner

(5) How many sexual partners have you had in last 12 months?

PAP TEST SCREENING

- (6) Have you had a Pap screen test in the last year? yes, no
(7) Have you ever had a positive pap screen test? yes, no
(8) Have you ever had a positive diagnosis of HPV? yes, no
(9) Have you ever had a positive diagnosis of another STI? yes, no
(10) Are you aware of a family history of cervical cancer? yes, no

SOCIO-DEMOGRAPHICS

11. "What is your age?" please include: Month__ Day__ Year_____
12. "What year are you in college?"
13. Do you consider yourself to be:
 Hispanic or Latino
 Asian
 Pacific Islander
 African American
 Caucasian
 More than one ethnicity?
14. "What best describes the area in which you grew up?"
 Rural
 Suburban
 Urban
16. "Do you have health insurance coverage?"
-

Appendix C

Interview Guide

(College Health Clinician)

Interviewing College Health Clinicians

Contexts in which HPV Communication Arises

1. “In what contexts does discussion concerning the HPV vaccine arise? How does the topic of HPV typically come up with your patients?”

- Prompt: STI testing or diagnosis?
- Prompt: contraceptive counseling?
- Prompt: Pap testing?
- Prompt: Other?

2. “Who typically initiates discussion about the vaccine (you the health care provider or the patient)?”

3. “Are there any issues that you raise in particular during HPV communication?”

Current Practice

4. “Please describe your typical clinical practice (i.e., what is said) when you discuss the HPV vaccine with your patients.”

Disease Framing

5. “How do you talk about the HPV vaccine?”

- Probe: as protecting against cervical cancer primarily?
- Probe: as protecting against HPV first?
- Probe: as protecting against genital warts?
- All?

6. “In your experience, which way of talking about the HPV vaccine receives the most favorable response?”

Normative Influences on HPV vaccine utilization

7. “What types of discussion regarding parents come up during HPV vaccine discussion?”

Relational Factors bearing on HPV vaccine utilization

8. “What types of dating/relationship status discussion comes up during HPV vaccine discussions with the patient?”

HPV Vaccine Refusers

9. “What types of reasons have college-aged women provided for not following up with the HPV vaccine?”

HPV Vaccine Acceptors

10. “What types of reasons have college-aged women provided for getting or wanting to get the HPV vaccine?”

Health Provider Perspective

11. Last comments: Open ended: “In your experience, what factors do you perceive as standing out most in motivating women (e.g., factors, contexts, experiences) to follow up with the HPV vaccine?”

Appendix D

HPV Vaccine Decision Narratives Codebook

Theme	Code	Subcategory
Vaccine Acceptance	Supportive Family Messages	<p>Financial: “My grandfather offered to pay.”</p> <p>Logistics: “My mother made the appt.”</p> <p>Informational: “My mother sent me an article about HPV”</p> <p>Injunctive norms: “My father said it was a good idea.”</p> <p>If my mom wouldn’t have supported it, I would not have gotten vaccinated.</p>
Vaccine Acceptance	Explicit Health Care Provider Endorsement Messages	<p>Having visited an HCP</p> <p>Explicit Endorsement</p> <p>“When my doctor pushed the vaccine it made me realize it was important.”</p> <p>He said, “you really need to get this.” He enforced the importance of getting it.</p> <p>When my doctor recommends the vaccine, then I’ll get the it.</p>
Vaccine Acceptance	Positive Peer Messages	<p>Descriptive norms:</p> <p>“All my nursing friends have had the vaccine.”</p> <p>“My friends have gotten it. It seems pretty normal to me. routine.”</p> <p>“All 3 girls in my dorm room—they’ve all gotten the vaccine.”</p> <p>“I’m in a sorority but everyone’s gotten it even though it hurts.”</p>

Vaccine Acceptance	Disease Framing Shapes Vaccine Benefit Perceptions (cancer, HPV, warts)	Cancer prevention: If the vaccine can prevent cancer, I'll get it. HPV, Warts
Vaccine Resistance	Skepticism about Vaccine Safety	Mistrust of Vaccines New Vaccine: There haven't been long-term studies done. That's the part everyone is nervous about. Metaphors about mistrust of new products Infertility fears
Vaccine Resistance	Overcoming Self-Efficacy Barriers	Cost Availability Time Fear of Parental Disclosure
Vaccine Resistance	Invoking Alternative Prevention Strategies	Being smart Using condoms "My mom said to just not be stupid about sex. If I'm smart about sex I don't need to get vaccinated. I feel like there are other less serious ways of preventing HPV." I can use a condom
Vaccine Resistance	Delay & Avoid Decision Strategy	"Since you can get vaccinated up to age 26, I have 5 more years to think about it."
Vaccine Resistance	Stigmatizing Messages	I really feel like HPV only affects people who don't make smart decisions. "If you got HPV it means you weren't smart about who you were sleeping with." "Only sluts get HPV." "At some point someone had poor judgment." "People who have STDs are careless and dirty."

Appendix E

Video Stimulus Development

Decision narratives from interviews with college women were used as narrative scripts employed for the video content promoting HPV vaccination. The video narratives consisted of 4 components: (1) HPV susceptibility (2) overcoming vaccine self-efficacy barriers—availability, cost, & time, (3) overcoming perceived vaccine harm perceptions, and (4) cues to vaccinate.

Narrative scripts were drafted for each of the four video components. These scripts were first reviewed by experts in HPV vaccination to ensure that the vaccine messages were accurate for medical content, as well as ethically and age appropriate. The expert advisory panel that reviewed the narrative scripts included:

- Margaret Spear, MD, Director of Penn State University Health Services (UHS)
- Heather Brandt, PhD, Research Assistant Professor, University of South Carolina Arnold School of Public Health
- Gregory Zimet, PhD, Professor of Pediatrics and Clinical Psychology, Adolescent Medicine, Indiana University School of Medicine
- Allison Friedman, MS, Health Communication, Division of STD Prevention, CDC.

After revisions, the finalized scripts were used to film, edit, and produce the final video narratives. Two versions of each video condition were produced varying the video by actress to rule out actor performance effects (Jackson & Jacobs, 1983). Narratives in the video consisted of direct-to-camera testimonials and re-enactments (see Appendices F-H). Upon

completion of the stimulus development, a panel of communication, new media, and sexual health experts reviewed the videos:

- Michelle Miller-Day, PhD, Associate Professor of Communication Arts and Sciences
- Michael Hecht, PhD, Distinguished Professor of Communication Arts and Sciences, PSU
- Shyam S. Sundar, PhD, Distinguished Professor, Department of Film-Video and Media Studies
- Eva Lefkowitz, PhD, Associate Professor of Human Development and Family Studies

The videos were then also reviewed by college women in two pilot focus groups to collect reactions to the videos from the intended audience.

Focus Group Pilot Tests of Stimulus Material

Two focus groups were conducted with college women in July 2008 to pilot test the HPV vaccine intervention. Focus group discussions (of college women's reactions after viewing two video narratives) were transcribed and data analyzed. Manipulation checks were performed with college women on whether they recognized the narratives as one- or two-sided messages. College women failed to recognize narratives as one- or two-sided. In response to the failed manipulation check, and in response to focus group discussions on the importance of narrative source if the intervention is intended to impact behavior (i.e., vaccine uptake) led to narrative source (peers versus experts versus peers and experts) becoming the central focus of the investigation.

Focus group participants were presented first with one video and their reactions solicited (the procedure that follows was repeated with the second video). Participants were asked to rate the video. Attitude toward the narrative was assessed with semantic differential items including: realistic/unrealistic, straightforward/misleading, not stereotyped/stereotyped,

memorable/forgettable, enjoyable/annoying, visually appealing/visually unappealing (Andsager et al., 2001). Additionally, the video was rated for “overall evaluation” consisting of: How interesting was the video to you? How much was the video directly meaningful to you personally? How much did you like the video overall? “Technical evaluation” consisting of: How much did you like the way the video looked? (visual quality), How much did you like the way the video sounded (audio quality), How well did you feel you understood the meaning of the words used in the video? How professional did you feel the video was? “video credibility” How much did you trust what the video said about the HPV vaccine? How much did you believe what the video said about the HPV vaccine? How much did you feel the video gave correct information about the HPV vaccine? How much did you agree with what the video said about the HPV vaccine? How much did you feel the video gave all the important facts about the HPV vaccine? (Herek et al., 1998). Finally, “engagement” was assessed by asking: Was the narrative interesting, Was it easy to pay attention to the story, I was bored during the video, The video looked real to me, The exemplars were believable and “identification” was assessed by asking: please rate how much the women in the videos is like each of the following people (my best friend, my other friends, me) (Lee & Hecht, 2008).

After responding to these scales individually, participants discussed their reactions as a group. The discussion was facilitated by the moderator who insured that everyone had the opportunity to participate. Focus group participants were also prompted for their perceptions with a series of open-ended questions. Questions included, “How did this video impact your vaccine intentions?” Manipulation checks were performed assessing whether participants monitored the proportion of valenced exemplars (i.e., that one video included exemplars only favoring the vaccine while the other video included exemplars that were skeptical of the vaccine)

exemplifying for instance negative side effects from the vaccine shot. This procedure was repeated for the second video.

Appendix F

Stimulus Development

Narrative Scripts for Peer-and-Provider Condition

Narrative Scripts for the Peer-and-Provider Video

DIDACTIC MESSAGE	HPV is the most prevalent STD at Penn State. In a classroom of 30 students, as many as 8 have HPV. HPV is very common and can lead to serious cervical disease.
SUSCEPTIBILITY Direct-to-Camera Testimonial	<p>PEER TESTIMONIALS (college woman)</p> <p>#1: One of my roommates got diagnosed with HPV and so we were discussing it. It was really traumatic for her. She's in a committed relationship and she's never been with any other partner so she didn't think she was at risk for this but she got HPV.</p> <p>#2: My best friend got the HPV vaccine because her older sister got the HPV virus and it turned out pretty badly. Now at age 30, the HPV infection has progressed into cervical cancer and she has had many surgeries to scrape out the cancer cells. My best friend's parents didn't want her to go through the same thing her sister did so she got the HPV vaccine.</p> <p>HEALTH CARE PROVIDER TESTIMONIAL (female nurse)</p> <p>We see a lot of women with significant cervical disease as a result of HPV.</p>
DIDACTIC MESSAGE	A majority of insurances cover costs of the HPV vaccine. Call your insurance to find out. The HPV vaccine is available at the new student health center.
OVERCOMING SELF-EFFICACY BARRIERS Re-enactment	<p>Student Health Waiting Room Scene: conversation between 2 college women</p> <p>Hey how are you? Hi, what are you doing here? I'm here to get my HPV vaccine. [Response] I'm here to get more information about it. I'm not sure about it. I heard it's really expensive. [Response] It's \$174 per shot here at the student health center but most medical insurances cover it. I paid for mine out of pocket because I think it's worth the benefits. For graduate students, the vaccine is covered. I know because one of my friends got the vaccine here. [Response] Oh</p>

	<p>alright but it isn't it a hassle to come back for the second and third shot and to keep track of your schedule? [Response] No not at all. After the first shot, you schedule your appointment for the next one, which is two months later and then they send you an email reminder the day before your next appointment and the appointment only takes 15 minutes. Then you're good to go.</p>
DIDACTIC MESSAGE	<p>Catch-up HPV vaccination is recommended for women ages 18-26. The Centers for Disease Control and Prevention approve the HPV vaccine as safe and effective.</p>
<p>OVERCOMING PERCEIVED VACCINE HARM PERCEPTIONS Direct-to-Camera Testimonial</p>	<p>HEALTH CARE PROVIDER (ADULT FEMALE PHYSICIAN)</p> <p>#1: You have a window of opportunity to get the HPV vaccine. You don't want to miss that opportunity. I'd say it's better to get the vaccine than to play the odds.</p> <p>#2: What we know for certain is that a number of young women who have been exposed to HPV and have not been vaccinated will go on to develop cervical cancer.</p> <p>PEER (college women)</p> <p>For my doctor to recommend the HPV vaccine I know that it had to be widely tested and approved as safe and effective. I trust that enough testing has been done on the HPV vaccine.</p>
DIDACTIC MESSAGE	<p>The HPV vaccine's been studied for nearly 10 years. 7 out of 10 cervical cancer cases can be prevented if people use this vaccine.</p>
<p>CUES-to-VACCINATE Re-enactment</p>	<p>DORM ROOM SCENE: conversation between 3 college women</p> <p>Where are you coming from? [Response of college woman #2 who just entered dorm room] I'm coming from the student health center. I just got the HPV vaccine. [college woman #3 sitting on bed] I heard it hurts. Did it hurt? [college woman #2] My arm feels a little sore but it feels like any other shot that we get when we come to campus. Have you gotten any yet? [response from college woman #1 also sitting on bed] No. It's too late for me. I'm already sleeping with John. [response from college woman #2] I asked the nurse about that today. She said that it doesn't matter if you are already sleeping with someone. You can still get protection. [response from college woman #3] But I'm not sleeping with anyone. How is that relevant to me? [response from college woman #2] Actually the nurse said that the very best time to</p>

get the vaccine is before you're having sex. [response from college woman #3] Well I still don't think I need it because I feel like HPV only affects people who don't make smart decisions. [response from college woman #1] Yeah, me and John are safe. [response from college woman #2] Well here's the thing. Wearing a condom helps protect you but it can't guarantee protection like the vaccine does because HPV gets transmitted skin-to-skin. And today the doctor told me that the vaccine is 100% effective against the 4 most common HPV types. [response from college woman #1] 100% effective? Wow, we should look into that.

**HEALTH CARE PROVIDER TESTIMONIAL
(ADULT FEMALE PHYSICIAN)**

10 women die from cervical cancer every day in this country. The HPV vaccine has the potential to prevent 7 of those 10 deaths. When my daughter was a college student she and I talked about the vaccine. She decided to get it and I was thrilled.

Appendix G

Stimulus Development

Narrative Scripts for Peer-only Condition

Narrative Scripts for the Peer-only Video

DIDACTIC MESSAGE	HPV is the most prevalent STD at Penn State. In a classroom of 30 students, as many as 8 have HPV. HPV is very common and can lead to serious cervical disease.
SUSCEPTIBILITY Direct-to-Camera Testimonial	<p>PEER TESTIMONIALS (college woman)</p> <p>#1: One of my roommates got diagnosed with HPV and so we were discussing it. It was really traumatic for her. She's in a committed relationship and she's never been with any other partner so she didn't think she was at risk for this but she got HPV.</p> <p>#2: My best friend got the HPV vaccine because her older sister got the HPV virus and it turned out pretty badly. Now at age 30, the HPV infection has progressed into cervical cancer and she has had many surgeries to scrape out the cancer cells. My best friend's parents didn't want her to go through the same thing her sister did so she got the HPV vaccine.</p>
DIDACTIC MESSAGE	A majority of insurances cover costs of the HPV vaccine. Call your insurance to find out. The HPV vaccine is available at the new student health center.
OVERCOMING SELF-EFFICACY BARRIERS Re-enactment	<p>Student Health Waiting Room Scene: conversation between 2 college women</p> <p>Hey how are you? Hi, what are you doing here? I'm here to get my HPV vaccine. [Response] I'm here to get more information about it. I'm not sure about it. I heard it's really expensive. [Response] It's \$174 per shot here at the student health center but most medical insurances cover it. I paid for mine out of pocket because I think it's worth the benefits. For graduate students, the vaccine is covered. I know because one of my friends got the vaccine here. [Response] Oh alright, but it isn't it a hassle to come back for the second and third shot and to keep track of your schedule? [Response] No not at all. After the first shot, you schedule your appointment for the next one, which is two months later and then they send you an email reminder the day before your next appointment and the appointment only takes 15</p>

	minutes. Then you're good to go.
DIDACTIC MESSAGE	Catch-up HPV vaccination is recommended for women ages 18-26. The Centers for Disease Control and Prevention approve the HPV vaccine as safe and effective.
OVERCOMING PERCEIVED VACCINE HARM PERCEPTIONS Direct-to-Camera Testimonial	PEER TESTIMONIALS (college women) #1: For my doctor to recommend the HPV vaccine I know it had to be widely tested and approved as safe and effective. I trust that enough testing has been done on the HPV vaccine. #2: As science major here at Penn State I work in a research lab studying vaccines. I understand the process for how vaccines get approved for public use. I know the FDA is vigorous in their testing
DIDACTIC MESSAGE	The HPV vaccine's been studied for nearly 10 years. 7 out of 10 cervical cancer cases can be prevented if people use this vaccine.
Cues-to-Action Re-enactment	DORM ROOM SCENE: conversation between 3 college women Where are you coming from? [Response of college woman #2 who just entered dorm room] I'm coming from the student health center. I just got the HPV vaccine. [college woman #3 sitting on bed] I heard it hurts. Did it hurt? [college woman #2] My arm feels a little sore but it feels like any other shot that we get when we come to campus. Have you gotten any yet? [response from college woman #1 also sitting on bed] No. It's too late for me. I'm already sleeping with John. [response from college woman #2] I asked the nurse about that today. She said that it doesn't matter if you are already sleeping with someone. You can still get protection. [response from college woman #3] But I'm not sleeping with anyone. How is that relevant to me? [response from college woman #2] Actually the nurse said that the very best time to get the vaccine is before you're having sex. [response from college woman #3] Well I still don't think I need it because I feel like HPV only affects people who don't make smart decisions. [response from college woman #1] Yeah, me and John are safe. [response from college woman #2] Well here's the thing. Wearing a condom helps protect you but it can't guarantee protection like the vaccine does because HPV gets transmitted skin-to-skin. And today the doctor told me that the vaccine is 100% effective against the 4 most common HPV types. [response from college woman #1] 100% effective? Wow, we should look into that.

Appendix H

Stimulus Development

Narrative Scripts for Provider-only Condition

Narrative Scripts for the Provider-only Video

DIDACTIC MESSAGE	HPV is the most prevalent STD at Penn State. In a classroom of 30 students, as many as 8 have HPV. HPV is very common and can lead to serious cervical disease.
SUSCEPTIBILITY Direct-to-Camera Testimonial	HEALTH CARE PROVIDER (female nurse) We see a lot of women with significant cervical disease as a result of HPV.
DIDACTIC MESSAGE	A majority of insurances cover costs of the HPV vaccine. Call your insurance to find out. The HPV vaccine is available at the new student health center.
DIDACTIC MESSAGE	Catch-up HPV vaccination is recommended for women ages 18-26. The Centers for Disease Control and Prevention approve the HPV vaccine as safe and effective.
OVERCOMING PERCEIVED VACCINE HARM PERCEPTIONS Direct-to-Camera Testimonial	HEALTH CARE PROVIDER TESTIMONIALS: #1: You have a window of opportunity to get the HPV vaccine. You don't want to miss that opportunity. I'd say it's better to get the vaccine than to play the odds. #2: What we know for certain is that a number of young women who have been exposed to HPV and have not been vaccinated will go on to develop cervical cancer.
DIDACTIC MESSAGE	The HPV vaccine's been studied for nearly 10 years. 7 out of 10 cervical cancer cases can be prevented if people use this vaccine.
Cues-to-Action Re-enactment	HEALTH CARE PROVIDER TESTIMONIAL (ADULT FEMALE PHYSICIAN) 10 women die from cervical cancer every day in this country. The HPV vaccine has the potential to prevent 7 of those 10 deaths. When my daughter was a college student she and I talked about the vaccine. She decided to get it and I was thrilled.

Appendix I

College Women's HPV Knowledge (N = 404)

HPV Knowledge	Answered correctly N (%)
Heard of HPV (yes)	372 (92)
HPV causes herpes (F)	209 (52)
Genital warts caused by HPV (T)	249 (62)
HPV causes cervical cancer (T)	390 (97)
Regular Pap as Prevention (T)	215 (53)
Normal Pap = no HPV (F)	213 (53)
Pap changes indicate HPV (T)	292 (72)
Warts caused by herpes (F)	87 (22)
HPV can cause cancer (T)	369 (91)
Pap almost always detects HPV (F)	152 (38)
Mother-baby transmission (T)	163 (40)

Appendix J

College Women's Knowledge of HPV Symptoms (N = 404)

HPV symptoms	Answered correctly N (%)
Warts that itch or bleed (T)	252 (62)
Sores that don't heal (F)	293 (73)
Discharge (F)	287 (71)
Warty growths (T)	146 (36)
Burning during urination (F)	286 (71)
Reduction in urine flow (F)	366 (91)
No visible symptoms (T)	268 (66)

Appendix K

College Women's Knowledge of Untreated HPV (N=404)

Consequences of untreated HPV	Answered correctly N (%)
Can cause cervical cancer (T)	380 (94)
Can cause infertility (F)	163 (40)
Can cause pre-cancer (dysplasia) (T)	247 (61)
Can cause warts (T)	162 (40)
Usually disappears by itself (T)	31 (8)
Can cause death (T)	148 (37)
Can cause sterility (F)	247 (61)

Appendix L

College Women's Knowledge of Risks for HPV Acquisition (N=404)

Risk for HPV infection	Answered correctly N (%)
Begin having sex before age of 16 (T)	132 (33)
If you have many sexual partners (T)	336 (83)
If your partner has many sexual partners (T)	323 (80)
Birth control (F)	379 (94)
Smoking (F)	365 (90)
Excessive stress (F)	365 (90)
Poor nutrition (F)	355 (88)

Appendix M

Identification Scale Items: Empathy, Internalization, and Exemplar Typicality

Empathy1	I tried to understand the exemplars in the video by imagining how things look from their perspective.
Empathy2	I felt as if the exemplars' thoughts were my own.
Empathy3	While watching the video I was very involved in what the exemplars were experiencing.
Empathy4	I experienced many of the same feelings that the exemplars expressed.
Empathy5	I could easily place myself in the position of the exemplars.
Empathy6	The exemplars in the video resonated with me.
Internalization1	The message seemed relevant to me.
Internalization2	The idea of protecting myself against HPV is important.
Internalization3	Penn State students should watch this message.
Internalization4	As a college student I realized how important this message is about getting vaccinated for HPV.
Internalization5	My friends need to watch this message.
Internalization6	As a Penn State student I realized this message speaks to me.

- Typicality1 The exemplars reminded me of a friend of mine.
- Typicality2 While watching the video I was thinking of someone I know.
- Typicality3 Watching this video made me think of a Penn State woman I know.
- Typicality4 The exemplars in the video reminded me of a close friend of mine.
-

Appendix N

Table 5.2

Identification Second Order Factor Structure – Standardized Factor Loadings (N = 251)

Item	λ (standardized)	Item	λ (standardized)
Empathy 1	.85**	Internalization6	.83**
Empathy 4	.83**	Internalization7	.85**
Empathy 9	.86**	Typicality1	.90**
Empathy 10	.81**	Typicality2	.90**
Empathy 11	.87**	Typicality3	.93**
Empathy 19	.90**	Typicality4	.90**
Internalization 1	.77**		
Internalization 2	.75**		
Internalization 4	.76**		
Internalization 5	.82**		

	γ	ζ
Identification with Empathy	.894	.049
Identification with Internalization	.713	.069
Identification with Typicality	.571	.076

** $p < .01$

Appendix O

Table 5.3

Narrative Transportation Scale Items

Transportation2	I was emotionally immersed while listening to the testimonials.
Transportation5	I was involved in the dialogue.
Transportation8	I remember most of what was said.
Transportation9	I was mentally involved in the scenes.

Table 5.4

Narrative Transportation Factor Structure – Standardized Factor Parameter Estimates (N=251)

Item	λ (standardized)
Transportation2	.83**
Transportation5	.79**
Transportation8	.60**
Transportation9	.83**

** $p < .01$

Appendix P

Table 5.5

Perceived Realism Items

Realism10	The messages in the video seemed not accurate/accurate.
Realism15	The message was not/was credible.
Realism18	I felt the video did/did not give correct information.
Realism20	The message had no/had informational value.
Realism21	The message was/was not authentic.

Table 5.6

Perceived Realism Factor Structure – Standardized Parameter Estimates (N =251)

Items	λ (standardized)
Realism10	.79**
Realism15	.79**
Realism18	.76**
Realism20	.72**
Realism21	.76**

** $p < .01$

Appendix Q

Table 5.7

Vividness Items

Vividness9	I liked the visual quality of the video.
Vividness10	The video was aesthetically pleasing.
Vividness11	I liked the audio quality of the video.
Vividness12	The imagery that occurred was vivid.

Table 5.8

Vividness Factor Structure – Standardized Parameter Estimates (N =251)

Items	λ (standardized)
Vividness9	.85**
Vividness10	.86**
Vividness11	.79**
Vividness12	.73**

** $p < .01$

VITAE
SUELLEN HOPFER

EDUCATION

Ph.D. The Pennsylvania State University, Health Communication, 2009
M.S. University of Arizona, Genetic Counseling, 1998
B.A. Earlham College, German/Economics, 1992

EMPLOYMENT

Post Doctorate, NIDA Prevention and Methodology Training (PAMT) Fellowship, 2009-2011
CDC Public Health Fellow, 2008-2009
Research Assistant, The Pennsylvania State University, 2004-2008
Genetic Counselor, UCLA Neurology, 2001-2004
Prenatal Birth Defects Screening Coordinator, CA Genetic Disease Branch, 2000-2001
Prenatal Genetic Counselor, Private Practice/Perinatology, Pasadena, CA, 1998-2000

PUBLICATIONS

- Hopfer, S.** (under review) College women's HPV vaccine decision narratives, *Health Communication*.
- Hopfer, S.** Davis, D., Kam, J. A., Shin, Y., Elek, E., Hecht, M. L. (in press). A review of elementary school-based substance use prevention programs: Identifying program attributes. *Journal of Drug Education*.
- Hecht, M. L. and **Hopfer, S.** (2010). Communication Theory of Identity in Jackson, R. L. II (Ed.) *Encyclopedia of Identity*, Thousand Oaks, CA: Sage.
- Warren, J. R., Allen, M. L., **Hopfer, S.**, Okuyemi, K. (2010). Contextualizing single-parent preadolescent drug use talks. *Qualitative research reports in communication*.
- Kugel, C., Retzlaff, C., **Hopfer, S.** Lawson, D., Daley, E., Drewes, C. Freedman, S. (2009). Familias con Voz: Community survey results from an intimate partner violence (IPV) prevention project with migrant workers. *Journal of Family Violence*, 24(8), 649-660.
- Hopfer, S.**, MacEachren, A. M. (2007). Leveraging the potential of geospatial annotations for group decisions: a communication theory perspective. *International Journal of Geographic Information Systems*, 8(21), 921-934.
- Hopfer, S.**, Chadwick, A. E., Parrott, R. L., Ghetian, C. B., Lengerich, E. J. (2009). GIS Mapping in State Comprehensive Cancer Control Programs: Assessment of Training Needs and Preferences. *Health Promotion and Practice*, 10, 579-587.
- Parrott, R. L., **Hopfer, S.**, Ghetian, C. B., Lengerich, E. J. (2007). Mapping as Visual Health Communication Tool: Promises and Dilemmas. *Health Communication*, 22(1), 13-24.
- Mansfield, C., **Hopfer, S.**, Marteau, T. M. (1999). Termination rates after prenatal diagnosis of Down syndrome, spina bifida, anencephaly, and Turner and Klinefelter syndromes: a systematic literature review. European Concerted Action: DADA (Decision-making After the Diagnosis of a Fetal Abnormality). *Prenatal Diagnosis*, 19(9), 808-812.

AWARDS

PSU, College of Liberal Arts Emerging Engagement Scholar Nominee, 2008
Top paper in communication technology, AEJMC, 2006
Finalist, Duke University Lange-Taylor Prize in Social Science/Documentary Collaboration, 1997