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Attitude Ambivalence, Social Norms, and Behavioral Intentions: Developing Effective Antitobacco Persuasive Communications

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Abstract

This study assessed the moderating effects of attitude ambivalence on the relationship between social norms, attitudes, and behavioral intentions to use tobacco. It was predicted that people would use social norms to reduce attitude ambivalence, and that reduced ambivalence would lead to changes in attitudes and behavioral intentions. To test this hypothesis, participants ($N=152$) were exposed to persuasive communications designed to influence attitude ambivalence and perceived social norms regarding tobacco use. Analysis indicated that providing a social norm antagonistic to tobacco use significantly reduced ambivalence among participants reading the ambivalence message ($p < .001$). Examining changes in tobacco attitudes from pre- to postpersuasive communications demonstrated a significant decrease in tobacco attitudes only for participants reading the ambivalence message who were provided with the antitobacco use norm ($p < .001$). Ambivalent message participants also expressed significantly lower intentions to use tobacco when provided with social norms indicating antitobacco sentiments ($p < .02$), and this significant decrease in intentions was associated with changes in attitudes toward tobacco. These results point to the important role of social norms in mediating the effects of attitude ambivalence on subsequent behavior in preventative programs targeting tobacco use.

Keywords

attitude ambivalence; social norms; persuasive messages; prevention

Tobacco products increase the risk of developing serious health issues, including lung cancer, coronary heart disease, and stroke—and cause more than 480,000 deaths every year (U.S. Department of Health & Human Services, 2014). Young adults between 18 and 25 represent the cohort with the highest prevalence of tobacco use in the United States. In 2012,

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the rate of current users in this age group was 38.1% (Substance Abuse and Mental Health Services Administration; SAMHSA, 2013). While preventative efforts have led to considerable success in decreasing young adult tobacco use between 2002 and 2012 (SAMHSA, 2013), there remains a high prevalence of smokers on college campuses (Johnston, O'Malley, Bachman, & Schulenberg, 2004; Lee, Bahreinifar, & Ling, 2014; Rigotti, Lee, & Wechsler, 2000; Thompson et al., 2007). Among college students, 33% are current smokers, and 46% have used tobacco in the past year (Rigotti et al., 2000). Unlike adolescents, college students possess more freedom to make their own decisions about their health, one of which is deciding to smoke (Emmons, Wechsler, Dowdall, & Abraham, 1998; Gfroerer, Greenblatt, & Wright, 1997). Upon transitioning into college, young adults who once smoked only occasionally become heavier smokers (Christie-Smith, 1999; Colder et al., 2006; Patterson, Lerman, Kaufmann, Neuner, & Audrain-McGovern, 2004; Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998). Further exacerbating the problem is the fact that the tobacco industry specifically targets college students through events in bars, nightclubs, and campus parties (Katz & Lavack, 2002; Ling & Glantz, 2002; Rigotti, Moran, & Wechsler, 2005). Tobacco use by college students remains an important issue to be addressed.

The effectiveness of antitobacco campaigns is likely responsible for the steady decrease in young adults' tobacco use since 2002 (SAMHSA, 2013). Antismoking messages can increase negative attitudes toward the tobacco industry (Hersey et al., 2003) and toward smokers (Pechmann & Knight, 2002; Pechmann & Ratneshwar, 1994), and can reduce young adults' smoking behaviors (Borders, Xu, Bacchi, Cohen, & SoRelle-Miner, 2005; Borland & Balmford, 2003; Goldman & Glantz, 1998; McVey & Stapleton, 2000; Rigotti, Regan, Majchrzak, Knight, & Wechsler, 2002). Despite the relative decline in tobacco use over the past decade, not all campaigns succeed. The overall effectiveness of antitobacco messages is mixed (e.g., Farrelly et al., 2002; Wakefield, Flay, Nichter, & Giovino, 2003; Wolburg, 2006), and tobacco use in college remains high. For example, in a qualitative study investigating college students' responses to antitobacco campaigns, Wolburg (2006) found that antismoking advertisements had little impact on college student smoking attitudes and in sometime triggered a desire to smoke (the "boomerang" effect; Ringold, 2002). To decrease smoking behavior in young adults, tobacco prevention advertisers should consider their audience's preexisting attitudes toward smoking.

Many antidrug media campaigns are designed to instill negative attitudes toward substances, assuming that negative attitudes will decrease the likelihood of usage (Kumpeer, 1997). However, smokers' attitudes are different from those of nonsmokers (Piko, 2001; Siegel, Alvaro, & Burgoon, 2003), and this likely determines the effectiveness of media campaigns. Nonsmokers are more likely to hold negative attitudes toward smoking and perceive few advantages, if any, of the behavior (Chang, 2009; Siegel et al., 2003; Wolburg, 2006). Smokers, in contrast, are more likely to hold some positive attitudes toward smoking and to report that smoking has benefits (Chang, 2009; Dijk, Reubsaet, de Nooijer, & de Vries, 2007; Schleicher, Harris, Catley, Harrar, & Golbeck, 2008; Siegel et al., 2003). As previous substance use literature demonstrates, favorable attitudes toward drug use are positively associated with behavioral intentions and subsequent use (Lacy, 1981; Ritter, 1988; Wolford & Swisher, 1986). One way to improve preventative messages is to investigate the relationship between *attitudes toward tobacco* and *actual tobacco use*. Psychologists have

long been at odds over the relationship between attitudes and behaviors (Crano & Prislín, 2006; McGuire, 1985). Today, the consensus is that attitudes can affect actions, but a number of variables moderate the attitude-behavior relation (Ajzen & Fishbein, 1977; Cacioppo, Gardner, & Berntson, 1997; Crano, 2012; Fishbein & Ajzen, 1975; Petty & Krosnick, 1995). Of the variables identified as potential moderators of the attitude-behavior link, attitude ambivalence is one of the most promising, but has received perhaps the least attention (Conner & Armitage, 2008), though a resurgence of research on ambivalence has occurred over the last decade (e.g., DeMarree, Wheeler, Briñol, & Petty, 2014).

People often simultaneously hold negative *and* positive evaluations of an attitude object. For example, one might enjoy the sensation of smoking and at the same time realize that tobacco is a danger to health. Consequences of attitude ambivalence are numerous: ambivalent attitudes are highly susceptible to persuasion (Bassili, 1996), less predictive of behavior (Armitage & Conner, 2000; Sparks, Harris, & Lockwood, 2004), less accessible in memory (Bargh, Chaiken, Govender, & Pratto, 1992; Krosnick, 1989), and associated with a variety of negative outcomes (Brown & Farber, 1951; Kaplan, 1972; Newby-Clark, McGregor, & Zanna, 2002; Priester, 2002; Rydell, McConnell, & Mackie, 2008). For example, Siegel et al. (2003) found that while nonsmokers and smokers held univalent attitudes toward smoking (either positive or negative), those at-risk for smoking (i.e., those considering smoking) perceived both benefits *and* disadvantages to smoking, and thus were viewed as ambivalent about tobacco use. Additionally, research by Zhao and Cai (2008) demonstrated that college students who were ambivalent about tobacco use sought out information about tobacco use more than college students who were not ambivalent (regardless of the students' attitudes toward tobacco use). Further, a study by Lipkus, Green, Fesganen, and Sedikides (2001) demonstrated that current college tobacco users who were ambivalent about tobacco use experienced greater desire to quit than users who were not ambivalent. Overall, ambivalence about tobacco products during college seems to be an important construct for both the initiation and cessation of tobacco use, and individuals who hold ambivalent attitudes toward smoking may be highly susceptible to antismoking messages.

A particularly negative outcome of attitude ambivalence is the cognitive conflict and psychological discomfort associated with simultaneously holding positive and negative evaluations toward the same attitude object (e.g., Newby-Clark et al., 2002). For example, if people believe they will have more friends if they smoke, but also fear the negative health consequences of tobacco use, they will experience cognitive conflict. This conflict results in an aversive evaluative tension (Has, Katz, Rizzo, Bailey, & Moore, 1992), of which the individual may or may not be consciously aware (Petty & Briñol, 2009). In either case, almost all drive-reduction theories (e.g., Festinger, 1957) hold that this tension is experienced as undesirable or unpleasant, and that accommodations will be made to reduce it if possible (Priester, 2002).

To reduce ambivalence, research suggests that people pay close attention to information that will facilitate resolution of the conflict (Briñol, Petty, & Wheeler, 2006; Clark, Wegener, & Fabrigar, 2008; Hohman, Crano, Siegel, & Alvaro, 2014; Maio, Bell, & Esses, 1996). For example, Maio and associates (1996) showed that highly ambivalent participants elaborated a persuasive message more intensely, and were more persuaded than nonambivalent

participants by strong messages. Other research demonstrates that people with highly ambivalent attitudes look for and use consensus information to resolve ambivalence (Hodson, Maio, & Esses, 2001). It seems evident that people seek information in the social context to reduce ambivalence.

A valued source for resolving ambivalence is one's social group (Hogg, 2006). Groups help define how members should think and act by supplying (social) norms for appropriate behavior that define expected and apposite attitudes and actions of group members (Hogg & Reid, 2006). Because attitudes are important features of group life, individuals look to their groups to determine the correct attitudes in circumstances of high ambivalence. Given that social norms define group related attitudes, they provide a viable means of reducing ambivalence. This idea is supported by considerable research that demonstrates in the absence of concrete information, people look to similar others for information on what to think and how to behave (Festinger, 1954; Suls & Miller, 1977; Suls & Wheeler, 2000). For tobacco use, a strong predictor of smoking behavior is the perception that smoking among peers is normative or acceptable (Alesci, Forster, & Blaine, 2003; Islam & Johnson, 2005; Parkinson et al., 2009; Sussman et al., 1988; Thompson et al., 2007; United States Department of Health & Human Services, 1994). Because of this, antitobacco campaigns that convey smoking as socially unacceptable are effective at reducing smoking (Pechmann & Goldberg, 1998; Pechmann, Zhao, Goldberg, & Reibling, 2003). Thompson et al. (2007) found that college smokers who perceived that less than 50% of their peers smoked were less likely to continue smoking. College students, in particular, demonstrate a strong identification with their university and other students at their school. Following the norm at their university is important for typical college students, so their perception of peer smoking at their school may play a major role in their own smoking behavior.

Taken together, people with ambivalent attitudes, who presumably feel enhanced evaluative tension, should be motivated to reduce ambivalence by adhering to the social norms of important identity groups. Aligning attitudes with the views of the group will transform the ambivalent attitude positively or negatively, depending on group norms, thereby reducing ambivalence. Social norms also should moderate the relation between attitude ambivalence and behavioral intentions: They should be stronger predictors of behavioral intentions for people holding highly ambivalent attitudes than for those whose attitudes are not ambivalent. For most college students, the university they attend is an essential part of their identity, rendering fellow university students as valuable references of behavior when dealing the discomfort associated with attitudinal ambivalence.

There is disagreement about the most appropriate way to measure ambivalence (Conner & Sparks, 2002; Priester & Petty, 1996; Thompson et al., 1995), but most research uses either the felt or the potential ambivalence methods. Felt ambivalence uses bipolar scales, asking respondents to indicate the degree of conflict they feel when evaluating an object. A strength of this approach is that it taps the discomfort experienced when evaluations conflict. However, this method has been criticized because extraneous factors may affect felt ambivalence (Bassili, 1996) and people's cognitive access to this type of information is far from established (Nisbett & Wilson, 1977; Zajonc, 1980). An alternate approach involves measurements that use separate items to tap positive and negative evaluations of an attitude

object (Armitage & Arden, 2007; Kaplan, 1972; Newby-Clark, McGregor, & Zanna, 2008). These positive and negative evaluations are combined to yield a single ambivalence score. The potential ambivalence measure does not suffer from the same criticisms as the felt ambivalence, and for that reason we use a measure of potential ambivalence in the current study. Additionally, a study by Lipkus et al. (2001) demonstrated that felt ambivalence about tobacco use is related to potential ambivalence.

Current Study

The current study was designed to determine if college students with ambivalent attitudes toward tobacco use referenced social norms to reduce ambivalence. Relatively few studies have explored the relationship between social norms and attitude ambivalence. In one, Hodson and colleagues (2001) assessed participants' ambivalence regarding social welfare. Their participants watched a debate about social welfare that presented both pro- and antiwelfare arguments. Then they provided participants with peer evaluations of the debate that indicated the majority thought the prosocial welfare (or the antisocial welfare) side had won the debate. Results indicated that highly ambivalent participants were more persuaded than those low in ambivalence by peer evaluations (consensus information), suggesting that they looked to others for information to reduce ambivalence. However, the researchers did not manipulate ambivalence experimentally, thus limiting our ability to determine cause-effect relationships. Additionally, consensus information about the winner of a debate is not the same as a social norm, which explicitly or implicitly indicates the beliefs one should hold.

In a more relevant study, Hohman and associates (2014) conducted a secondary analysis of data from a longitudinal study to determine if ambivalence about marijuana use rendered adolescents more persuadable by their friends' opinions about marijuana. Analysis revealed that friends' norms significantly predicted behavioral intentions (cross-sectionally) and future behavior (longitudinally) when adolescents held ambivalent marijuana attitudes. These results suggest that adolescents use social norms to reduce ambivalence. However, the study did not manipulate ambivalence or social norms, limiting our ability to determine if adolescents looked to their friends when they were ambivalent or if having friends who strongly favored marijuana use led adolescents to become ambivalent. Despite the research of both Hodson et al. (2001) and Hohman et al. (2014), there remain important questions with respect to the relationship between social norms and attitude ambivalence.

In the current research, attitude ambivalence and the presence or absence of a stated social norm regarding tobacco use were manipulated. Change in attitudes from pre- to postpersuasive communication, along with behavioral intentions to use a tobacco product, were measured. The attitude object for the current study was tobacco use—participants read an ambivalent or univalent persuasive communication about tobacco use, and were provided with either an antitobacco social norm or were told that the social norm was not known. The hypotheses for this study follow:

Hypothesis 1: Ambivalence about tobacco use will be greater when the persuasive message is ambivalent and the social norm is unknown compared to when the message is ambivalent and the social norm is antitobacco.

Hypothesis 2: A decrease in favorability of tobacco attitudes from pre- to postpersuasive communication is predicted among participants provided with the ambivalent message and antitobacco norm.

Hypothesis 3: Intentions to use tobacco will be lowest among those provided with the ambivalent message and antitobacco norm.

Hypothesis 4: The relationship between the persuasive communication and social norms on behavioral intentions will be mediated by changes in attitude.

Overall, this research will inform prevention researchers on one method through which tobacco use can be reduced—messages that increase ambivalence and then provide a social norm antagonistic to usage should be particularly effective at reducing tobacco use.

Method

Participants

Seventy-seven male and 75 female participants ($N=152$, $M_{\text{age}}=19.60$, $SD=3.34$) were recruited from the psychology participant pool at a Midwest University to participate in the study, which was hosted on the Qualtrics website.

Procedure and Measures

This study was a 2 (persuasive communication—ambivalent vs. univalent communication) $\times$ 2 (social norms—antitobacco use vs. unknown) factorial design with intentions to use a tobacco product as the main dependent variable, and change in attitude toward tobacco use as the mediating variable. Prior tobacco use was a covariate.

The research was introduced as a study of how people respond to health-related messages. Participants were told that they would read a health-related message, answer a few questions, and provide their opinions about health-related behaviors. To begin, participants indicated their attitude with a single item about the degree to which they favored or opposed tobacco use (1 = *strongly oppose*, 7 = *strongly favor*; $M=3.31$, $SD=1.49$). Then, participants read a health-related persuasive communication that either contained only negative aspects of tobacco use (univalent condition, $n=70$) or both positive and negative aspects of tobacco use (ambivalent condition, $n=82$), see Appendix. This is a standard manipulation of ambivalence (Conner & Sparks, 2002; van Harreveld, Rutjens, Rotterveel, Nordgren, & van der Pligt, 2009).

After reading the persuasive communication, participants read a message that constituted the manipulation of social norms, using a standard manipulation of social norms (e.g., Ajzen & Fishbein, 1977; Reno et al., 1993). The antitobacco use norm read ($n=79$), “*Results of a recent study at [Midwest] University found that only 9% of students approve of tobacco use. The goal of this message is to convince students that they should continue to hold a negative view of tobacco use.*” In the norm unknown condition, participants read ($n=73$), “*Results of*

a recent study at [Midwest] University found that students do not have an opinion about tobacco use. The goal of this message is to convince students that they should hold a negative view of tobacco use.”

Participants answered a few questions about the message to substantiate the purpose of the study, and then rated the message’s persuasiveness (1 = *very ineffective*, 7 = *very effective*; $M = 4.35$, $SD = 1.36$), how well it was constructed (1 = *horrible*, 7 = *excellent*; $M = 4.84$, $SD = .98$), and how convincing it was (1 = *not at all convincing*, 7 = *extremely convincing*; $M = 4.44$, $SD = 1.08$). As a manipulation check for the social norms manipulation, participants were asked, “In your opinion, how much do [Midwest University] students approve or disapprove of tobacco use?” (1 = *strongly disapprove*, 7 = *strongly approve*; $M = 4.24$, $SD = 1.31$).

To measure ambivalence, participants answered four semantic differential items about tobacco use (i.e., how good [1]- bad [5], pleasant [1]-unpleasant [5], beneficial [1]- harmful [5], and valuable [1]- worthless [5]; $\alpha = .87$). We computed the SD across the four-items of the semantic differential to determine participants’ level of ambivalence ($M = .628$, $SD = .873$). The SD scale can range from 0 (no variability across the items) to 2.31 (highest possible variability across the four items). A similar measure of ambivalence was used in Hohman et al. (2014). This measure is conceptually similar to the potential ambivalence measure of Kaplan (1972), which uses a composite of negative and positive evaluations to measure ambivalence. The SD measure avoids some of the issues with Kaplan’s method of combining positive negative scores into a separate index (for a discussion refer to Ullrich, Schermelleh-Engel, & Böttcher, 2008). The SD approach provides a clear and useful conceptual analog to the typical measure of potential ambivalence and avoids the statistical issues associated with the typical measure. Additionally, we chose to use an indirect measure of ambivalence after manipulating ambivalence because a more direct measure (e.g., measuring felt ambivalence) could impact on the dependent measures that followed.

A central dependent measure, which also is used in a mediation analysis of usage, was participants’ change in attitude toward intentions for tobacco use from pre- to postpersuasive communication. The same one-item measure used in the premessage attitude measure was used for the postmessage measure ($M = 3.05$, $SD = 1.50$). Next, participants indicated their intentions to use a tobacco product in the next year (1 = *absolutely will not use a tobacco product*, 5 = *absolutely will use a tobacco product*; $M = 2.43$, $SD = 1.56$).

The final section of the questionnaire obtained demographic data (e.g., sex, age) and previous tobacco use. To control for prior tobacco use in analyses reported below, participants identified their previous tobacco use (1 = *I have never used a tobacco product*, 2 = *I have used a tobacco product once or twice in the past but I no longer use tobacco products*, 3 = *I use tobacco products once a month*, 4 = *I use tobacco products once a week*, 5 = *I use tobacco products more than once a week but not daily*, 6 = *I use tobacco products daily*; $M = 2.43$, $SD = 1.70$).

Results

Background Variables

Participants were college students enrolled in a psychology class. The sample was predominately White (62.5% White, 19.1% Hispanic, 5.3% Multiracial, 3.3% Asian, 6.6% Black, and 3.3% other)—ethnic proportion did not differ as a function of the persuasive communication or social norms manipulation. A two-way persuasive communication by social norms analysis of variance (ANOVA) on age revealed no significant effects. A logistic regression (with persuasive communication and social norms entered in the first step and their interaction entered in the second step) on sex revealed no significant main effects or an interaction.

Persuasive Communication Effectiveness

Effectiveness—A two-way persuasive communication by social norms analysis of covariance (ANCOVA) on perceived effectiveness of the persuasive message was conducted, controlling for previous tobacco use. The effectiveness analysis revealed only a significant main effect for social norms, $F(1, 147) = 3.99, p = .047, \eta_p^2 = .026$. The persuasive communication was perceived to be more effective when the antitobacco norm was provided ($M = 4.11, SE = .157$) compared with when no norm was provided ($M = 4.55, SE = .150$).

Constructed—A two-way persuasive communication by social norms ANCOVA on how well constructed the persuasive message was, controlling for previous tobacco use, was conducted. This analysis revealed only a significant main effect for social norms, $F(1, 147) = 11.10, p = .001, \eta_p^2 = .070$. The persuasive communication was perceived to be better constructed when the antitobacco norm was provided ($M = 4.57, SE = .112$) compared to when no norm was provided ($M = 5.09, SE = .108$).

Convincing—A two-way persuasive communication by social norms ANCOVA on how convincing the persuasive message was perceived to be, controlling for tobacco use, was conducted. The convincing analysis revealed a significant main effect for social norms, $F(1, 147) = 6.88, p = .01, \eta_p^2 = .044$. The persuasive communication was perceived to be more convincing when the antitobacco norm was provided ($M = 4.20, SE = .123$) compared with the no norm condition ($M = 4.64, SE = .117$). As well, there was a nonsignificant marginal trend for the interaction between the persuasive communication and social norms, $F(1, 147) = 3.51, p = .063, \eta_p^2 = .023$. When reading the ambivalent message, participants thought the message was more convincing when provided the antitobacco norm ($M = 4.81, SE = .162$) compared with no norm ($M = 4.03, SE = .171$), $F(1, 147) = 10.43, p = .002, \eta_p^2 = .066$.

However, for the univalent message, there was no significant difference on convincingness when the norm was unknown ($M = 4.37, SE = .176$) or known to be antagonistic to tobacco use ($M = 4.48, SE = .178$), $F(1, 147) = .21, p = .651, \eta_p^2 = .001$. For the other simple effects, when social norms were antitobacco there was no significant difference between the ambivalent ($M = 4.81, SE = .162$) and univalent messages ($M = 4.48, SE = .178$), $F(1, 147)$

$= 1.71, p = .192, \eta_p^2 = .011$. When social norms were unknown there was no significant difference between the ambivalent ($M = 4.03, SE = .171$) and univalent messages ($M = 4.37, SE = .176$), $F(1, 147) = 1.95, p = .165, \eta_p^2 = .013$.

Social Norm Manipulation Check

A two-way persuasive communication by social norms ANCOVA on the social norm measure, controlling for previous tobacco use, was conducted. The social norms analysis revealed only a nonsignificant marginal trend for social norms, $F(1, 147) = 3.80, p = .053, \eta_p^2 = .025$. Participants tended to believe that students approved of tobacco use more in the norm unknown condition ($M = 4.47, SE = .152$) than in the antitobacco norm condition ($M = 4.05, SE = .147$); although not statistically significant, the marginal trend suggests the social norm manipulation operated as planned.

Ambivalence

A two-way persuasive communication by social norms ANCOVA on ambivalence, controlling for previous tobacco use, revealed a significant main effect for social norms, $F(1, 147) = 4.77, p = .03, \eta_p^2 = .031$. Participants had significantly more ambivalence in the norm unknown condition ($M = .497, SE = .09$) than the antitobacco norm condition ($M = .775, SE = .09$). However, this main effect must be interpreted in light of a significant interaction between persuasive communication and social norms, $F(1, 147) = 5.82, p = .017, \eta_p^2 = .038$, see Figure 1. As predicted (Hypothesis 1), when reading the ambivalent message, participants had significantly greater ambivalence when the social norm was unknown ($M = 1.004, SE = .128$) compared with when the norm was clearly antagonistic to tobacco use ($M = .406, SE = .120$), $F(1, 147) = 10.97, p = .001, \eta_p^2 = .071$. However, for the univalent message there was no significant difference in ambivalence when the norm was unknown ($M = .547, SE = .131$) or known to be antagonistic to tobacco use ($M = .588, SE = .134$), $F(1, 147) = 0.01, p = .924, \eta_p^2 < .001$. For the other simple effects, when social norms were antitobacco use there was no significant differences between the ambivalent ($M = .406, SE = .120$) and univalent conditions ($M = .588, SE = .134$), $F(1, 147) = 0.35, p = .556, \eta_p^2 = .002$. When social norms were unknown, ambivalence was significantly higher in the ambivalent condition ($M = 1.004, SE = .128$) compared with univalent condition ($M = .547, SE = .131$), $F(1, 147) = 6.51, p = .012, \eta_p^2 = .044$.

Attitude

A two-way persuasive communication by social norms repeated measures ANCOVA, with the pre- postpersuasive communication attitude as the repeated factor, controlling for previous tobacco use, revealed a significant repeated measures by social norm interaction, $F(1, 147) = 4.19, p = .049, \eta_p^2 = .028$ (Figure 2). When the antitobacco norm was provided there was a significant decrease in attitudes from pre- ($M = 3.16, SE = .114$) to postpersuasive communication ($M = 2.78, SE = .106$), $F(1, 147) = 15.89, p = .001, \eta_p^2 = .098$.

However, there was no significant difference in preattitude ($M = 3.52$, $SE = .118$) and postattitude ($M = 3.42$, $SE = .110$) when no norm was provided, $F(1, 147) = .97$, $p = .326$, $\eta_p^2 = .007$.

The three-way interaction between persuasive communication, social norms, and the repeated factor also was statistically significant, $F(1, 147) = 5.88$, $p = .017$, $\eta_p^2 = .038$ (Figure 3). Examining the three-way interaction, the change from preattitude to postattitude was only significant for the ambivalent communication when the antitobacco norm was provided, $F(1, 147) = 20.31$, $p = .001$, $\eta_p^2 = .12$: participants had a significant decrease in their attitude from pre- ($M = 2.72$, $SE = .158$) to postpersuasive communication ($M = 2.12$, $SE = .147$). There was no significant change in attitude from pre- ($M = 3.56$, $SE = .165$) to postpersuasive communication ($M = 3.59$, $SE = .154$) when participants read the ambivalent message with no norm provided ($F(1, 147) = .07$, $p = .80$, $\eta_p^2 < .001$), when they read the univalent message with no norm provided ($M_s = 3.49$ and 3.26 , $SE_s = .169$ and 1.57 ; $F(1, 147) = 2.63$, $p = .107$, $\eta_p^2 = .018$), or when they read the univalent message with the antitobacco norm provided ($M_s = 3.60$ and 3.44 , $SE_s = .172$ and $.160$; $F(1, 147) = 1.29$, $p = .259$, $\eta_p^2 = .009$).

Intentions

A two-way, persuasive communication by social norms ANCOVA with behavioral intentions as the dependent measure, controlling for previous tobacco use, revealed only a statistically significant interaction between persuasive communication and social norms, $F(1, 147) = 6.67$, $p = .011$, $\eta_p^2 = .043$. When the norm was unknown, there was a nonsignificant marginal trend for the difference between the ambivalent ($M = 2.69$, $SE = .151$) and univalent messages ($M = 2.31$, $SE = .155$), $F(1, 147) = 3.15$, $p = .078$, $\eta_p^2 = .021$. When the antitobacco use norm was present, participants had significantly less intention to use tobacco after reading the ambivalent message ($M = 2.17$, $SE = .143$) compared to reading the univalent message ($M = 2.60$, $SE = .160$), $F(1, 147) = 3.82$, $p = .05$, $\eta_p^2 = .025$. For the other simple effects, for the ambivalent message, participants had significantly lower intentions to use tobacco when the antitobacco norm was present ($M = 2.17$, $SE = .143$) than when the norm was unknown ($M = 2.69$, $SE = .151$), $F(1, 147) = 5.96$, $p = .016$, $\eta_p^2 = .039$. For the univalent message, there was no significant difference in intentions between the antitobacco norm ($M = 2.60$, $SE = .160$) and norm unknown ($M = 2.31$, $SE = .155$) condition, $F(1, 147) = 1.75$, $p = .188$, $\eta_p^2 = .012$.

Mediation Analysis

Following Preacher and colleagues (Preacher & Hayes, 2008; Preacher, Rucker, & Hayes, 2007), moderated mediation analyses were conducted to examine the conditional indirect effect of tobacco attitude on the interaction of persuasive communication and social norms on intentions to use tobacco (see Antonakis, Bendahan, Jacquart, & Lalive, 2010; Hayes,

2009). For this analysis we used Model 8 in SPSS (Hayes, 2013) with 50,000 bootstrapped samples.

The total effect of the interaction between persuasive communication and social norms on intentions was statistically significant (Path c, $R^2 = .664$, $R^2 = .015$, $F(1, 147) = 6.67$, $p = .011$, $\beta = -.593$, $t = -2.58$, $p = .011$). When the postmessage attitude (and the premessage attitude entered as a covariate) was entered into the model, this relationship was no longer statistically significant (Path c, $\beta = -.170$, $t = -.730$, $p = .467$). Results from the moderated mediation analysis indicated that the total indirect effect (interaction between ambivalence and social norms $\rightarrow$ attitude $\rightarrow$ intentions) was statistically significant—total indirect effect = $-.282$, $SE = .130$, 95% CI bias corrected $[-.585, -.071]$. Examining this mediation, the conditional indirect effect of attitude on intentions remained significant for social norms for the ambivalent message, indirect effect = $-.266$, $SE = .113$, 95% CI bias corrected $[-.519, -.073]$, whereas it was not significant for the univalent message, indirect effect = $.016$, $SE = .046$, 95% CI bias corrected $[-0.064, .126]$. Thus, change in tobacco attitudes mediated the interactive effect of persuasive communication and social norms on intentions to use tobacco.

Discussion

Young adults show the highest prevalence of tobacco use of all other age groups in the United States. Compounding this problem, college students are specifically targeted by the tobacco-industry through events in bars, nightclubs, and campus parties (Rigotti et al., 2005). Preventative efforts designed to counter tobacco-industry marketing strategies rely on the assumption that increasing negative attitudes toward tobacco will decrease tobacco use (Kumpeer, 1997), and while these techniques show some success (Dennhardt & Murphy, 2013; Larimer, Kilmer, & Lee, 2005), there is more that can be done to improve antitobacco use messages. The current study investigated the relationship between attitudes and behavior with specific focus on attitude ambivalence as key feature in preventing college student tobacco use. At some point, almost everyone will experience the evaluative conflict that arises from attitude ambivalence. The resultant aversive feeling arising from this conflict has important implications for prevention researchers, because people are motivated to seek information in the social environment to reduce it, and its cause—ambivalence. To develop a more complete understanding of how ambivalence affects the attitude-behavior relationship for health behaviors may require researchers to investigate aspects in the social environment that reduce ambivalence. The purpose of the current study was to determine if social norms could be one such factor.

For the first hypothesis (with ambivalence as the outcome), analysis demonstrated that social norms decreased ambivalence—as evidenced by the significant difference in ambivalence when the social norm regarding tobacco use was presented as either unknown or antagonistic to use. These results indicate that social norms reduced attitudinal ambivalence. Research indicates that when people are ambivalent they process information in the environment to reduce it (Briñol et al., 2006; Clark et al., 2008; Hohman et al., 2014; Maio et al., 1996). Our results suggest that social norms may be a crucial feature of the information search.

For attitude change (Hypothesis 2), the analysis disclosed a significant decline in favorability of tobacco use attitudes among participants exposed to the ambivalent message, if they received the antitobacco use norm. For the other experimental conditions, there was no significant change in attitudes. This result suggests that to reduce ambivalence people may change their attitudes to be in accord with social norms. Normative information from important groups lets people know what their attitude should be, and to the extent that the norm is univalent, attitude ambivalence should be reduced. The current study provided either an antitobacco norm or information that the norm was not known. It would have been interesting to include an ambivalent norm condition and determine how that affected attitude change and behavioral intentions; however, it was deemed undesirable, as such a manipulation might have encouraged tobacco use. There is some research that supports this concern: when people are given a reason to attribute the aversive feelings of attitude ambivalence (e.g., as because of a placebo) they do not experience the negative outcomes of ambivalence (Nordgren, van Harreveld, & van der Plight, 2006).

For behavioral intentions (Hypothesis 3), there was a significant difference in ambivalence effects when the antitobacco social norm was present versus unknown—antitobacco use norms led to significantly lower future use intentions. A moderated mediation analysis (Hypothesis 4) was conducted to determine if the significant results for behavioral intentions were linked to a change in attitudes. Results from this analysis indicated that the significant decrease in intentions among those provided the antitobacco norm was associated with a significant decrease in attitudes toward tobacco use. This result makes sense in light of research that demonstrates that ambivalence moderates the attitude-behavior relation (e.g., Conner, Povey, Sparks, & James, 2003; Moore, 1973, 1980; Sparks, Hedderley, & Shepherd, 1992; Sparks, Conner, James, Shepherd, & Povey, 2001). It suggests that attitudes are stronger predictors of behavior when they are univalent. When participants changed their attitude to fall in line with the social norm, the attitude became univalent, and they subsequently aligned their intentions to fall in line with the norm as well.

Across all results in this study, we demonstrated that social norms play an important role in the reduction of ambivalence. However, the extent to which social norms reduce ambivalence depends whether or not the norm provides a univalent attitudinal prescription—that is, what the person's attitude should be—and the extent to which the person identifies with the group that provides the norm (Hogg, 2006). The extent to which people follow social norms depends on how strongly they identify with the group—the more they identify with the group the more they follow the group's norms (Abrams & Hogg, 2010). This suggests that identification may be the underlying process that accounts for social norms reducing ambivalence. Future research should explore the relationship between attitude ambivalence, social norms, and group identification.

That we could compare only an antisocial norm with an unknown norm condition is limitation to this study, but as noted, because of ethical concerns we could not include a protobacco use norm in the study design. A future study might use a balanced design using an attitude object in which it would be ethical to include both pro- and antisocial norm conditions. Another limitation to our design was that we included a measure of behavioral intentions but no measure of actual behavior. Therefore, whereas we can confidently

conclude that social norms provided to people who are ambivalent will lead to changes in behavioral intentions, we cannot be certain that those changes will lead to behavior change. However, considerable research suggests that intentions are powerfully predictive of subsequent behavior (e.g., Webb & Sheeran, 2006).

Another limitation to this study was that tobacco attitudes were measured with only a single item. It would have been better to include a multiitem measure of tobacco attitudes and future research should explore how ambivalence and social norms impact multiitem scales of tobacco attitudes. Additionally, the single-item measure of tobacco attitudes was a global attitude measure, rather than a specific measure of tobacco use by oneself. Therefore, when answering this question it is possible that participants were not thinking about their attitude about tobacco use, but rather for other people. However, past research suggests that specific attitudes are linked with global attitudes in memory (Petty, Briñol, & DeMarree, 2007). Nonetheless, future research should include more specific attitude questions when measure attitudes about tobacco use.

This research indicates that social norms can reduce the cognitive conflict that occurs as a result of attitude ambivalence. When people hold both positive and negative opinions about an attitude object, they will look to social norms of important in-groups to reduce that conflict. Antitobacco campaigns should consider the social groups that are most important to the targeted respondents' identity when designing prevention messages, because these groups serve as normative references that foster resolution of attitude ambivalence. The prevention messages in the current study focused on attitudes toward tobacco use, but future research should expand to other problematic health behaviors on college campuses such as binge drinking, abuse of prescription drugs, and engaging in risky sexual behavior. Adding to the utility of this research, the use of ambivalence and social norms in prevention messages could be applied to many different populations (not just college students) and many different health behaviors. Overall, prevention messages that increase ambivalence about a health issue and then provide a social norm on the issue should be particularly effective in changing people's behavioral intentions.

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Appendix. Persuasive Communications

Univalent Message: Tobacco use is one of the most deadly behaviors. In the United States alone, 1,200 people die each day from a tobacco related disease. Use of tobacco products lead to an increased risk of heart disease, stroke, lung cancer, and several other cancers (e.g., bladder, mouth, kidney, and stomach). Other health consequences of tobacco use include higher rates of infertility, pregnancy problems, and general fitness issues. Therefore, the World Health Organization, Food and Drug Administration, the Centers for Disease Control and Prevention, and almost every medical board and association on the face of the Earth holds an antitobacco platform. Even though the negative health consequences of tobacco use are well documented and known, people continue to begin using and continue using tobacco products. If you or someone you know would like more information on tobacco use or help to quit using please go to thetruth.com, smoke-free.gov, or call 1-877-937-7848 (a toll-free quit line).

Ambivalent Message: Tobacco use is one of the most deadly behaviors. In the United States alone, 1,200 people die each day from a tobacco related disease. Use of tobacco products lead to an increased risk of heart disease, stroke, lung cancer, and several other cancers (e.g., bladder, mouth, kidney, and stomach). Other health consequences of tobacco use include higher rates of infertility, pregnancy problems, and general fitness issues. Therefore, the World Health Organization, Food and Drug Administration, the Centers for Disease Control and Prevention, and almost every medical board and association on the face of the Earth holds an antitobacco platform. Even though the negative health consequences of tobacco use are well documented and known, people continue to begin using and continue using tobacco products. Reasons that people provide for using tobacco products include: enjoying the taste, to deal with stress, it makes them to feel good, because it is cool, and for social reasons. If you or someone you know would like more information on tobacco use or help to quit using please go to thetruth.com, smokefree.gov, or call 1-877-937-7848 (a toll-free quit line).

Figure 1. Ambivalence as a function of the ambivalence and social norms manipulations. Error bars represent 95% confidence interval.

Figure 2. Change in tobacco attitude from premessage to postmessage as a function of the ambivalence and social norms manipulations. Error bars represent 95% confidence interval.

Figure 3. Intentions to use tobacco as a function of the ambivalence and social norms manipulations. Error bars represent 95% confidence interval.