

How negative descriptive norms for healthy eating undermine the effects of positive injunctive norms

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Abstract

Healthy eating intentions were assessed as a function of theory of planned behavior variables and manipulated group norm salience. Participants ($n = 119$) were exposed (or not) to a positive injunctive norm that their fellow students approve of eating healthily, and (or not) to a negative descriptive norm that their fellow students do not eat healthily. A significant interaction emerged. When a negative descriptive norm was made salient, participants exposed to a positive injunctive norm reported significantly *lower* intentions to eat healthily. When no descriptive norm was given, exposure to a positive injunctive norm had no effect. The results suggest the weakness of manipulated injunctive norm salience in the health domain, and the importance of investigating the interactive effects of referent group norms.

Being overweight or obese poses great risk to an individual's health and increases their chances of developing long-term and life-threatening illnesses, such as heart disease (Van Gaal, Mertens, & De Block, 2006). However, obesity and associated health risks can be prevented or reversed through a healthy lifestyle including a balanced diet (Swinburn, Caterson, Seidell, & James, 2004). Despite this knowledge, many people still fail to make healthy eating choices. In the current paper, we explore how the combined influence of what others approve of and what others actually do impacts on decision making in health contexts.

Previous interventions have often aimed to educate individuals about the benefits of nutrition, and to equip them with the knowledge to make healthier food choices. However, this strategy has been ineffective in improving and changing individuals' dietary habits (e.g., Croll, Neumark-Sztainer, & Story, 2001; Wardle, 1993). Although longitudinal studies have demonstrated that individuals have good nutritional knowledge and understand the requirements of a balanced diet, this knowledge fails to translate into healthy food choices (e.g., Kelder, Perry, Klepp, & Lytle, 1994; Kelder, Perry, Lytle, & Klepp, 1995). Clearly, factors other than knowledge influence decision making in this domain. Hence, research needs to identify alternative means for achieving behavior change. In this paper, we investigate the healthy eating decisions¹ of

young adults using the theory of planned behavior (TPB) and explore sources of normative influence from a social identity and norm focus perspective.

Expanding on the theory of reasoned action (Ajzen, 1985; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the TPB is widely applied to understand behavioral decision making, and to predict the likelihood of engagement in specific behaviors (Ajzen, 1991). The TPB proposes that attitudes, subjective norms, and perceived behavioral control predict an individual's intention to engage in a specific behavior, which is the most proximal determinant of actual behavior. Attitudes are measures of how favorable or unfavorable an individual perceives performing a specific behavior to be. The subjective norm reflects the expectations and wants of significant others about engaging in a specific behavior. Perceived behavioral control is a measure of how much control an individual perceives they have over engaging in a behavior and their confidence in their ability to perform it. If an individual holds favorable attitudes, perceives a supportive subjective norm, and has high perceived behavioral control, they are more likely to intend to engage in a specific behavior.

mend a daily diet including 6–9 servings of high fiber breads and cereals (also including rice, pasta, noodles); 5 servings of vegetables; 2 servings of fruit; 2 servings of milk or alternative; 1 serving of lean meat or an alternative; and 0–2 servings of extra food (i.e., foods higher in fat and/or sugar, salt and kilojoules).

¹Healthy eating in this study was conceptualized according to guidelines for healthy eating to which participants were exposed in the study, which recom-

The TPB model is a robust predictor of an array of health behaviors including exercise, food choices, and medical screenings (e.g., Conner & Sparks, 1996). Similarly, Godin and Kok (1996) found that the TPB explained 41% of variance in intentions to engage in health-related behaviors (see also Ajzen & Albarracín, 2007, for a review). More specifically, there is strong support for the efficacy of the TPB in predicting healthy eating intentions. For example, tests of the model indicate that it accounts for between 30% and 50% of the variance in young adults' intentions to follow a healthier diet (Astrom & Rise, 2001; Blue & Marrero, 2006; Fila & Smith, 2006; Louis, Davies, Smith, & Terry, 2007; Oygard & Rise, 1996). The model has been found to explain between 35% and 50% of adults' intentions to increase their fruit and vegetable consumption (Blanchard et al., 2009; Bogers, Brug, van Assema, & Dagnelie, 2004; Sjoberg, Kyungwon, & Reicks, 2004), and around 25% of the variance in actual fruit and vegetable consumption (Blanchard et al., 2009). Healthy eating is also predicted in clinical populations by the model (White, Terry, Troup, Rempel, & Norman, 2011). In line with these findings, a recent review revealed that the predictive power of the TPB model in explaining adults' healthy eating intentions is superior to other decision-making theories (Guillaumie, Godin, & Vézina-Im, 2010).

Although previous research has demonstrated that the TPB model is a robust predictor of healthy eating intentions, research has found that the subjective norm is the weakest predictor of healthy eating intentions, compared with attitudes and perceived behavioral control (Bogers et al., 2004; Oygard & Rise, 1996). Indeed, a meta-analysis (Armitage & Conner, 2001) revealed that the subjective norm, across a range of different behaviors, had a weaker association with intentions than either attitudes or perceived behavioral control. The average Pearson's correlation between intentions and the subjective norm was .33 compared with correlations of .49 for attitudes and .43 for perceived behavioral control.

The reliably weak influence of the subjective norm is inconsistent with previous research demonstrating that individuals are strongly influenced by social norms (e.g., Burger et al., 2010; Cialdini, Kallgren, & Reno, 1991; Smith, Louis, & Schultz, 2011). Social norms are the accepted or implied rules about how people should and do behave (Sherif, 1936; Turner, 1991). They are powerful determinants of behavior in domains ranging from college drinking to tipping (Azar, 2004; Dams-O'Connor, Martin, & Martens, 2007). Given the observed difference in the strength of subjective norms as a predictor when compared with other forms of social norms, a number of researchers have sought to improve the normative component of the TPB model by addressing flaws in its conceptualization.

In the original TPB model, no distinction was made between injunctive and descriptive norms (Cialdini et al.,

1991; Cialdini & Trost, 1998; Donald & Cooper, 2001); that is, norms of what others approve of and norms of what others actually do. In addition, it has been argued that the subjective norm construct fails to tap into relevant referent group identities (Terry & Hogg, 1996; Terry, Hogg, & White, 2000). Distinguishing between salient descriptive and injunctive norms and considering the extent to which norms are tied to relevant reference groups have both been shown to be important in disentangling the effects of social norms (Cialdini, Reno, & Kallgren, 1990; Terry & Hogg, 1996; Terry, Hogg, & White, 1999; Terry et al., 2000).

Specifically, although the subjective norm incorporates only injunctive elements, research has shown that making a distinction between descriptive and injunctive norms improves the predictive power of the TPB. Two recent reviews have demonstrated that descriptive norms have an independent effect on intentions, explaining an additional 3%–5% of the variance in intentions (Manning, 2009; Ravis & Sheeran, 2003). In relation to eating behavior, the descriptive norm has been shown to predict intentions independent of injunctive norms in several studies (e.g., Berg, Jonsson, & Conner, 2000; Lally, Bartle, & Wardle, 2011; Moore, Moore, & Murphy, 2009; Nejad, Wertheim, & Greenwood, 2004; Povey, Conner, Sparks, James, & Shepherd, 2000; Tuu, Olsen, Thao, & Anh, 2008; Yun & Silk, 2011). In line with these findings, it has been suggested that an expanded TPB model should include both subjective injunctive and descriptive norms to increase its predictive power (Ajzen & Fishbein, 2005).

Although descriptive and injunctive norms are typically treated as independent predictors of intentions and behavior (Ravis & Sheeran, 2003; cf. Manning, 2009), it is important to consider how these norms might interact to influence behavior (e.g., Göckeritz et al., 2010). Indeed, the possibility of such interactions was first highlighted in Cialdini et al.'s (1990) original studies on littering behavior. In one study, individuals were significantly more likely to litter after observing a confederate litter in an already littered environment, thereby demonstrating the power of the descriptive norm. However, when in a subsequent study, a confederate littered in an environment in which the litter had been swept into a pile, thereby suggesting that littering was unacceptable (i.e., making salient a conflicting injunctive norm), individuals were much less likely to litter. These findings suggest that the presence of an anti-littering injunctive norm suppressed the effect of the descriptive norm. Moreover, a recent meta-analysis by Manning (2009) suggests that the presence of a countervailing injunctive norm moderates the effect of the descriptive norm on behavior.

Even after considering the independent and interactive effects of the descriptive and injunctive norm, the predictive power of norms is still often limited. Researchers using social identity theory have argued that the subjective norm taps the interpersonal level of influence (i.e., significant others) and

neglects other sources of normative influence that are key determinants of behavior, such as referent group norms (Terry & Hogg, 1996). In the social identity approach, norms are proposed to have a greater effect on intentions and behavior if these are linked to important reference groups for the individual (Tajfel & Turner, 1979; Terry & Hogg, 1996; Terry et al., 2000). This is because when individuals' group membership becomes embedded in their self concept, they look to what other group members approve of and how other group members behave when determining their own behavior. In a program of research spanning a range of different behavioral domains, Terry, Hogg and colleagues have demonstrated that individuals report stronger intentions to engage in behaviors when group norms are made salient to show that this behavior is endorsed by and engaged in by other group members (see Hogg & Smith, 2007 and Smith & Louis, 2009, for reviews).

Although previous research has included both injunctive and descriptive group norms, they are often measured and manipulated at different levels (Smith & Louis, 2008, 2009). For example, Cialdini et al. (1990) included different referent sources for their injunctive and descriptive norms. The referent source for the injunctive norm could be perceived as the government, local authorities, and/or cleaning staff, whereas the descriptive norm referent source included individuals in the local environment. Orthogonally manipulating injunctive and descriptive norms at the same level of analysis may enable researchers to identify the independent effects of each norm on intentions and behavior (Smith & Louis, 2008, 2009).

Currently, there is little published research that has addressed both the group level of analysis and distinguished between injunctive and descriptive norms. Smith and Louis (2008) conducted two studies where they orthogonally manipulated the injunctive and descriptive group norms in a political context. Participants were presented with an injunctive norm where the reference group approved (supportive injunctive norm) or disapproved (unsupportive injunctive norm) of signing a petition against full fee university places, and a descriptive norm that the reference group signed (supportive descriptive norm) or did not sign the petition (unsupportive descriptive norm). Participants were most likely to sign the petition if they were exposed to a supportive injunctive norm and an unsupportive descriptive norm, but this effect emerged only when the issue was assumed to be important to participants (the introduction of full fee places for Australian undergraduate students, a salient political issue at the time). In contrast, in a second study where the issue was of low importance (the introduction of comprehensive university exams, which was not a genuine proposal at the time of research), conflict between the descriptive and injunctive norm stymied, rather than motivated, behavior.

In a second paper, Smith et al. (2012) report three studies orthogonally manipulating referent group norms in the environmental domain. All three observed that misaligned norms (supportive injunctive paired with unsupportive descriptive norms, or vice versa) were as demotivating as aligned unsupportive norms; only when positive descriptive *and* injunctive norms were made salient was a higher level of environmental behavior observed. Although these experiments have thus examined the effects of both descriptive and injunctive norms for a relevant reference group, the results are inconsistent, and limited to the contexts of political and environmental behavior. It is not clear if referent group norms will operate in the same manner in the context of health behavior.

In the case of health behaviors, such as healthy eating, the shared consequences of the actions for group members (such as the cost to the taxpayer through demand on the health system) are more distal, whereas individual consequences (such as impacts on personal health and appearance) are salient and relatively immediate. In contrast, for collective behaviors examined in previous research, such as political action (e.g., Smith & Louis, 2008), and environmental behaviors (e.g., Cialdini et al., 1990; Fornara, Carrus, Passafaro, & Bonnes, 2011; Göckeritz et al., 2010; McDonald, Fielding, & Louis, 2013, 2014; Smith et al., 2012), the outcomes affect all, and few individual-level consequences may be expected in the short term. The consequences of norm violation for the group (and thus the potential motivating effects of pro-social motivation) vary: for health behavior, one's own life is at risk if one conforms to an unhealthy referent group norm. We cannot assume therefore that social influence will operate in the same manner for behaviors with different individual and collective consequences. Research is needed to determine whether the interactive influence of salient injunctive and descriptive norms is stable across different behavioral domains.

The present research

The current paper investigates healthy eating intentions using a TPB framework. In order to improve the predictive utility of the model, more specifically the normative component, we integrate the social identity theory and norm focus approaches. This experiment addresses a gap in the literature by examining the interaction between the injunctive and descriptive norms of a relevant reference group in a health context.

In this study, we manipulated the salience of real norms, as it is assumed that the participants will be familiar with them given the extent of publicity about the eating behaviors of Australians. Participants' healthy eating intentions and behavior were measured after being presented

with injunctive and descriptive group norms, which pilot testing had indicated were realistic for the reference group. In contexts where manipulating the content of the referent norms is impractical, either because of ethical concerns or because participants already have strong perceptions of the norms (e.g., from media coverage or ongoing campaigns), manipulating norm salience is expected to yield similar results to a content-based manipulation, both from the social identity theoretical model and from the empirical findings of past research (e.g., McDonald, Fielding, & Louis, 2013, 2014). In the present study, participants were presented with a positive injunctive norm (i.e., that the group approves of healthy eating), a negative descriptive norm (i.e., that the group does not engage in healthy eating), both norms, and neither norm. If the norms operate independently, making salient an unhealthy descriptive norm is expected to undermine healthy intentions, whereas making salient a positive injunctive norm should promote them. As no published empirical research has examined this interaction outside of political and environmental contexts, two competing predictions for their interrelationship can be drawn from previous research (Smith & Louis, 2008; Smith et al., 2012): making salient the conflict between an injunctive and descriptive norm could motivate behavior (as it did when the political issue was salient and important to participants), or the conflict could disengage people and reduce behavior (as it did when the political issue was not important to participants, and in the environmental domain).

Hypotheses

Based on the findings of previous research (Blanchard et al., 2009; Blue & Marrero, 2006; Bogers et al., 2004; Guillaumie et al., 2010; Louis et al., 2007; Oygard & Rise, 1996; Sjoberg et al., 2004), we predicted that an expanded TPB model (including subjective injunctive and descriptive norms) would predict intentions to eat healthily and healthy eating behavior. More specifically, we hypothesized that more favorable attitudes (H1), subjective injunctive norm (H2a), subjective descriptive norm (H2b), and greater perceived behavioral control (H3) would be associated with greater intentions to eat healthily. In addition, we predicted that greater intentions to eat healthily and greater perceived behavioral control would be associated with healthier eating behavior (H4, H5).

In line with previous findings (Johnston & White, 2003; Louis et al., 2007; Norman, Clark, & Walker, 2005; Ravis & Sheeran, 2003), we predicted that the manipulated student group injunctive and descriptive norms would predict healthy eating intentions and behavior over and above that predicted by the TPB model. More specifically, we hypothesized that exposure to a positive injunctive norm

would be associated with higher intentions to eat healthily and healthier eating behavior (H6), and exposure to a negative descriptive norm would be associated with lower intentions to eat healthily and unhealthy eating behavior (H7).

Furthermore, we anticipated that the manipulated injunctive and descriptive student group norms would interact to predict healthy eating intentions (H8) and behavior (H9). More specifically, we hypothesized that the presence of a salient negative descriptive norm would eliminate the effect of a salient positive injunctive norm such that participants would report lower healthy eating intentions, and would display unhealthy eating behavior. This is consistent with the findings of Cialdini et al. (1990), and Study 2 in Smith and Louis (2008). Smith and Louis (2008) identified a different pattern of results in Study 1 of their research where the presence of a positive injunctive norm and a negative descriptive norm was associated with the strongest intentions. However, Smith and Louis (2008) argued that these participants' intentions may have reflected their internalized moral responsibility to act in a specific political context. We reasoned that this sense of moral responsibility should not apply in a health context. As no published research has examined the interaction between the injunctive and descriptive norms of a relevant referent group in a health context, the present study fills a gap in the literature that has considerable applied importance in tackling obesity-related health issues. In addition, this study makes a theoretical contribution to the understanding of social norms by examining the interaction of descriptive and injunctive norms on a behavior with more salient individual than collective consequences, in contrast to previous research in the political and environmental domains.

Method

Participants and design

A sample of 119 students from an Australian university voluntarily participated in the study. The participants were 88 women (74%) and 25 men (21%) and 6 who did not indicate gender. The participants were aged between 17 and 33 years with a median age of 18 years ($SD = 2.97$).

Intentions to eat healthily and healthy eating behavior were dependent measures predicted using a 2 (positive injunctive norm: salient/not salient) \times 2 (negative descriptive norm: salient/not salient) between-groups design. The participants were thus randomly assigned to one of four conditions: a salient positive injunctive norm only condition, a salient negative descriptive norm only condition, a condition with both norms made salient, and a no salient norm control condition.

Procedure

Students in an introductory class were invited to participate in a study of healthy eating behaviors in exchange for a snack reward. After the participants completed the questionnaires and received their snack(s), the researcher addressed the class to give a verbal debriefing regarding the manipulations used in the experiment. The students also received an in-depth debriefing sheet that provided further details about the theoretical background and purpose of the experiment.

Manipulation and measures

Group norms manipulation

The participants were instructed to read an information sheet that included six guidelines for eating healthily. The guidelines specified the servings of each food group that women and men require for a balanced diet. Real positive injunctive and/or negative descriptive norms, derived from pilot testing ($n = 30$) about the beliefs and eating behaviors of students at the university, were either presented or not underneath the healthy eating guidelines.

Participants in the salient positive injunctive norm condition read that “the majority of [University name] students approve of eating healthily, and think that students should follow the 6 healthy eating guidelines” whereas participants in the salient negative descriptive norm condition read that “the majority of [University name] students do not incorporate the 6 guidelines into their regular daily diet.” Pilot testing had confirmed that these are accurate reports; that is, the manipulations made salient preexisting norms rather than seeking to manipulate their content. The salience of the two types of norms was manipulated orthogonally such that participants received the salient injunctive norm, the salient descriptive norm, or both norms. Participants in the control condition were presented only with the healthy eating guidelines and received no normative information. Following this, participants completed the outcome measures. Unless stated otherwise, all items were adapted from Ajzen (2006).

Group norm manipulation checks

A single item was used as an injunctive norm manipulation check (i.e., “Most [University name] students would think that I should follow all 6 guidelines for eating healthily”: 1 very unlikely to 7 very likely). Similarly, a single item served as a descriptive norm manipulation check (i.e., “Most [University name] students will engage in all 6 guidelines for eating healthily themselves”: 1, very unlikely to 7, very likely).

Attitudes

Participants’ attitudes toward eating healthily were measured using a single item (i.e., “When you personally think about following all 6 guidelines for eating healthily over the next two (2) weeks, do you consider eating healthily to be”: 1, very bad to 7, very good).

Subjective injunctive and descriptive norms

A single item measured the injunctive subjective norm, (i.e., “My family and friends think I should follow all 6 guidelines for healthy eating everyday over the next two (2) weeks”: 1, very unlikely, to 7, very likely). The descriptive subjective norm was also measured with a single item (i.e., “Most of my family and friends whose opinions I value, eat healthily themselves”: 1, very unlikely to 7, very likely).

Perceived behavioral control

A single item measure was used to assess participants’ perceived control over eating healthily (i.e., “For me to eat healthily, it is”: 1, extremely difficult to 7, extremely easy).

Healthy eating intentions

Healthy eating intentions were assessed using a single item (i.e., “Over the next two (2) weeks, how likely are you to follow all 6 guidelines for eating healthily as recommended by the Australian Government?”: 1, very unlikely, to 7, very likely).

Behavioral measure

The participants were given the option of choosing an unhealthy snack (a small chocolate or sweet) and/or a healthy snack (apple or orange). Each participant was given the snack(s) and a code was recorded of -1 to 1 where higher scores indicated healthy eating behavior. Participants were assigned a code of -1 if they only selected an unhealthy snack, a code of 1 if they only selected a healthy snack, and a code of 0 if they chose both types of snack or neither snack.

Demographic information

Participants recorded their age in years, and reported their gender as male (1) or female (2).

Results

Preliminary analyses

Means, standard deviations, and Pearson’s correlations among the variables are presented in Table 1. Overall, the participants held positive attitudes toward healthy eating, perceived high behavioral control, and perceived that those close to them approved of eating healthily (i.e., positive subjective injunctive norm) and ate healthily (i.e., positive subjective

Table 1 Means, Standard Deviations, and Correlations Among the Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Manipulated injunctive norm (-1,1)	.18	.99										
2. Manipulated descriptive norm (-1,1)	.04	1.00	-.08									
3. Age (17-33)	18.88	2.97	-.03	.06								
4. Gender (1 = men, 2 = women)	1.78	.42	.09	-.17 [†]	-.11							
5. Attitudes (1-7)	5.88	1.05	-.06	.04	.01	.33***						
6. Control (1-7)	4.67	1.32	.05	-.40	.04	.10	.34***					
7. Subjective injunctive norm (1-7)	5.14	1.55	.14	-.03	.18*	.29**	.40***	-.10				
8. Subjective descriptive norm (1-7)	4.58	1.42	.07	-.12	.05	.12	.26**	.23*	.26**			
9. Intentions (1-7)	3.95	1.66	-.04	-.08	.20*	.11	.39***	.44***	.30***	.33***		
10. Healthy eating behavior (-1-1)	-.21	0.81	.08	-.12	-.12	.12	.13	.26***	-.04	.07	0.33***	

[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

descriptive norm). In line with the TPB, intentions were correlated with attitudes, the subjective injunctive norm, the subjective descriptive norm, and the perceived behavioral control (Ajzen, 1991). Furthermore, intentions were positively associated with healthy eating behavior. However, the manipulated injunctive and descriptive norms were not associated with either intentions or healthy eating behavior.

Examination of the correlations revealed moderate intercorrelations among the TPB variables. However, given that the theoretical distinctions between the variables are clear according to the TPB (Ajzen, 1991), they were retained as unique predictors in the analyses below.

To minimize potential multicollinearity with the interaction term and improve the interpretability of the coefficients, all variables were mean centered prior to conducting the hierarchical multiple regressions (Cronbach, 1987). In addition, the manipulated variables were assigned unweighted effect codes (i.e., no-norm salient condition was coded -1; salient norm condition was coded +1).

Manipulation checks

A 2 (injunctive norm: salient/not salient) \times 2 (descriptive norm: salient/not salient) analysis of variance was conducted to check the effects of the manipulations. The cell means and standard deviations are reported in Table 2. There was a significant main effect of the injunctive norm salience manipulation on perceived injunctive norms, $F(1, 115) = 4.93, p = .028, \omega^2 = .04$, such that when the positive injunctive norm was made salient, the participants perceived more positive injunctive norms ($M = 5.16, SD = 1.16$) than when it was absent ($M = 4.63, SD = 1.38$), although the norm was significantly positive (above the mean) in each case, $ps < .003$. There was no main effect of the descriptive norm manipulation on perceived injunctive norms, $F(1, 115) = .24, p = .624, \omega^2 = .00$, and there was no significant interaction $F(1, 115) = .67, p = .416, \omega^2 = .01$. The injunctive manipulation therefore induced perceptions that fellow students approve of eating healthily, as well as making the positive norm salient.

Table 2 Manipulation Checks for the Manipulated Injunctive and Descriptive Norms

	Perceived descriptive norm	Perceived injunctive norm
Negative descriptive norm present		
Positive injunctive norm present	3.29 (1.06)	5.12 (1.12)
Positive injunctive norm absent	2.79 (.99)	4.17 (1.10)
Negative descriptive norm absent		
Positive injunctive norm present	3.42 (1.20)	5.19 (1.21)
Positive injunctive norm absent	3.29 (1.19)	4.48 (1.69)

Note. Standard deviations are presented in parentheses.

Perceived descriptive norms were equally negative when the negative descriptive norm was salient ($M = 3.35, SD = 1.05$) and when it was not salient ($M = 3.04, SD = 1.19$), $F(1, 115) = 2.22, p = .139, \omega^2 = .02$; the norm was significantly below the mean in each case, $ps < .001$. There was also no main effect of the injunctive norm on the perceived descriptive norm, $F(1, 115) = 2.34, p = .129, \omega^2 = .02$, and there was no significant interaction, $F(1, 115) = -.82, p = .368, \omega^2 = .01$. Participants perceived that fellow students do not eat healthily regardless of whether the negative descriptive norm was made salient or not.

Regression analyses

Overview of analyses

Two hierarchical multiple regression analyses were conducted where intentions and healthy eating behavior were regressed onto the predictor variables. The TPB variables, control variables (age and gender), and the manipulated injunctive and descriptive norms were entered in Block 1. The two-way interaction between the injunctive and the descriptive norm was entered in Block 2. For healthy eating behavior, intentions were entered in Block 3 as a potential mediator of the other TPB variables (see Table 3).

Table 3 Hierarchical Regression Analysis of Intentions and Healthy Eating Behavior

	Intentions (β)		Healthy eating behavior (β)		
	Block 1	Block 2	Block 1	Block 2	Block 3
Age	.14	.17 [†]	-.20	-.12	-.17 [†]
Gender (1 = men, 2 = women)	-.07	-.10	.08	.06	.10
Attitudes	.15	.22*	.06	.11	.02
Control	.38***	.40***	.25*	.26*	.11
Subjective injunctive norm	.22**	.20 [†]	.02	.01	-.07
Subjective descriptive norm	.08	.10	-.03	-.02	-.06
Manipulated positive injunctive norm	-.10	-.07	.08	.10	.12
Manipulated negative descriptive norm	-.11	-.06	-.06	-.03	.00
Descriptive norm* injunctive norm interaction		-.24*		-.15	-.07
Intentions					.38***
R^2 ch.	.35***	.04*	.11	.02	.09***
R^2	.35***	.38***	.11	.13	.22**

[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Predicting intentions

In Block 1, the model accounted for significant variance in intentions to eat healthily, $F(8,101) = 6.73$, $p < .001$, R^2 ch = .35. Inspection of the coefficients revealed that greater perceived behavioral control was associated with stronger intentions to eat healthily ($\beta = .38$, $p < .001$, $sr^2 = .10$). Also, when participants perceived that significant others approved of eating healthily, they reported higher intentions to eat healthily ($\beta = .29$, $p = .043$, $sr^2 = .03$). No other variables were significant unique predictors (β s $< .15$, p s $> .101$, sr^2 s $< .02$). In particular, as shown in Table 3, there was no direct effect on intentions of either the manipulated injunctive norm salience ($\beta = -.07$, $p = .424$, $sr^2 = .00$) or the manipulated descriptive norm salience ($\beta = -.06$, $p = .453$, $sr^2 = .00$).²

In Block 2, the inclusion of the interaction term accounted for a significant increase in variance, $F(1,100) = 5.93$, $p = .017$, R^2 ch = .04 ($\beta = -.21$, $p = .017$, $sr^2 = .04$). Simple slopes of the manipulated injunctive norms were inspected for each of the descriptive norm conditions; that is, when the negative descriptive norm was made salient or not (see Figure 1). When the negative descriptive norm was not salient, the presence of a salient positive injunctive norm had no significant effect on intentions to eat healthily ($\beta = .14$, $p = .274$, $sr^2 = .01$). However, when a negative descriptive norm was salient, participants in the salient positive injunctive norm condition reported significantly lower intentions to eat healthily ($\beta = -.27$, $p = .014$, $sr^2 = .04$). The final model

²From a theoretical perspective, it is possible that the group norm effects are weak because only those who highly identified with the referent group conformed to the norms. Group measured identification was included as part of a broader experiment and additional analyses were conducted on intentions and behavior in which group identification was entered in the final block along with the interactions of identity and the norm manipulations. However, no consistent interactions were observed and the variance accounted for did not significantly increase.

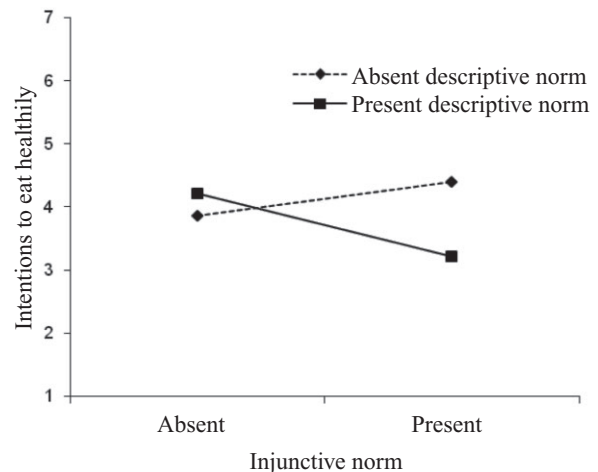


Figure 1 Intentions to eat healthily as a function of positive injunctive norms (present vs. absent) and negative descriptive norms (present vs. absent).

accounted for 38% of variance in intentions, $R^2 = .38$, $F(9,100) = 6.93$, $p < .001$. As shown in Table 3, the significant predictors of intentions were attitudes and control. Furthermore, age and the subjective injunctive norm were marginal predictors.³

³These present analyses test the interaction of manipulated referent group injunctive and descriptive norms. It is also possible to test the interaction of measured subjective injunctive and descriptive norms. If this interaction is included as a new predictor in the third Block, there is no significant increase in variance accounted for $F(1,99) = .55$, $p = .458$, R^2 ch. = 00, and the significance of the manipulated injunctive and descriptive norm interaction does not change. We did not include the interaction of the measured variables in the main analysis as the intercorrelation observed between the measured subjective injunctive and descriptive norms means the test of the interaction would be unstable.

Predicting healthy eating behavior

The model did not account for significant variance in behavior in Block 1, $F(8,101) = 1.63$, $p = .126$, $R^2ch = .11$ (see Table 3). Inspection of the coefficients, however, revealed that perceived behavioral control had a significant positive association such that individuals who reported greater control over eating healthily chose a healthier snack ($\beta = .25$, $p = .028$, $sr^2 = .04$). No other variables were unique predictors ($|\beta|s < .12$, $ps > .224$, $sr^2s < .01$). In particular, there was no effect of the manipulated injunctive norm salience ($\beta = .07$, $p = .456$, $sr^2 = .00$) or descriptive norm salience ($\beta = -.06$, $p = .549$, $sr^2 = .00$).

The interaction did not account for additional variance in Block 2, $F(1,100) = 2.09$, $p = .151$, $R^2ch = .02$, $\beta = -.15$, $sr^2 = .02$. However, the inclusion of intentions in Block 3 resulted in a significant increase in variance accounted for $F(1,99) = 11.39$, $p < .001$, $R^2ch = .09$. Participants who reported higher intentions to eat healthily were more likely to choose a healthy snack ($\beta = .38$, $p < .001$, $sr^2 = .09$). The final model accounted for 22% of variance in healthy eating behavior, $R^2 = .22$. $F(10,99) = 2.82$, $p = .004$.⁴

Discussion

The current experiment investigated the influence of salient descriptive and injunctive referent group norms in a new domain, namely healthy eating intentions and behaviors. We assessed whether an expanded TPB model incorporating social identity and norm focus theory would predict participants' intentions and behavior. We also investigated experimentally whether the orthogonally manipulated student group injunctive and descriptive norms were independent and/or interacting predictors of intentions and behavior.

The results revealed partial support for the TPB as a predictor of healthy eating intentions and healthy eating behavior. There was also some support for norm focus theory as the subjective injunctive and descriptive norms were differential predictors of intentions. Considered independently, both were correlated with intentions, but when considered jointly only the subjective injunctive norm was significant (Table 3). In addition, there was partial support for both norm focus theory and social identity theory with manipulated injunctive and descriptive student group norms interacting to predict healthy eating intentions.

TPB

The findings from the current experiment are generally consistent with previous research that has indicated that the TPB

model has utility in relation to the prediction of healthy eating intentions (Blanchard et al., 2009; Blue & Marrero, 2006; Bogers et al., 2004; Guillaumie et al., 2010; Louis et al., 2007; Oygard & Rise, 1996; Sjoberg et al., 2004). In the current study, the TPB variables uniquely accounted for 14% of variance in intentions and a significant but small 5% of variance in observed behavior.

As predicted, attitudes and perceived behavioral control were positively associated with healthy eating intentions (H1, H3). The subjective injunctive norm marginally predicted intentions to eat healthily (H2a), but contrary to expectations, the subjective descriptive norm did not (H2b). Furthermore, healthy eating intentions significantly predicted healthy eating behavior (H4).

When participants held favorable attitudes, inferred that their family and friends approved of eating healthily, and perceived greater control over eating healthily, they reported higher intentions to eat healthily. Furthermore, participants who reported higher intentions to eat healthily were more likely to choose a healthy snack reward. These findings are in line with the TPB model and previous research (Ajzen, 1991; Blue & Marrero, 2006; Louis et al., 2007; Sjoberg et al., 2004). These significant findings are the more impressive because, as Table 1 illustrates, high average scores on variables such as attitudes toward healthy eating would have restricted the range of the measures, depressing the variance accounted for.

However, participants' perceptions that their friends and family ate healthily did not influence their healthy eating intentions. This is inconsistent with previous research that has demonstrated that the descriptive norm significantly increases the variance explained in intentions (Manning, 2009; Ravis & Sheeran, 2003). In the final model, greater perceived behavioral control did not predict healthy eating behavior, a finding that is also inconsistent with previous research (Sjoberg et al., 2004), and the TPB (Ajzen, 1991).

Although it was a methodological strength that the current experiment investigated the unique contributions of subjective injunctive and descriptive norms, the measurement of the subjective norms could be criticized on two levels. Subjective norms were measured rather than manipulated, and the two predictors were intercorrelated, which can introduce statistical instability to the results of multiple regression analyses, unpredictably increasing or decreasing the coefficient from its true size in the population (Dunlap & Kemery, 1988). In addition, the subjective norms were measured using the referent, family and friends. However, the recommended referent for the TPB is "people who are important to me" (Ajzen, 1991). Although there is likely to be an overlap between family and friends and people who are important to students, this wording may have weakened the effects of the subjective norms. Alternatively, it is possible that group level norms are just more

⁴Consistent with earlier analysis, the interaction between the measured subjective injunctive and descriptive norms was included as an additional predictor in Block 4. There was no increase in variance accounted for $F(1,98) = .14$, $p = .714$, $R^2ch = .00$, and the pattern of predictors did not change.

important in this context, so interpersonal norms are less salient and comparatively weaker. Few studies in the planned behavior area have examined descriptive and injunctive norms at *both* the interpersonal and group levels, so the comparison itself is of theoretical interest.

It is also important to note that the present research examined the interaction of manipulated referent group norms in a new domain, that of healthy eating. Unexpectedly, the experimentally manipulated salience of student group injunctive and descriptive norms did not show significant direct effects on intentions and behavior over and above that predicted by the TPB model (H6, H7). More specifically, making a positive injunctive norm or a negative descriptive norm salient did not increase or decrease (respectively) healthy eating intentions or behavior. These findings are inconsistent with previous research that has identified both the referent injunctive and descriptive group norms as significant and unique predictors of intentions and behavior (Johnston & White, 2003; Louis et al., 2007; Norman et al., 2005; Ravis & Sheeran, 2003). There is a theoretical reason to believe that norm salience would yield similar results as a content manipulation, which indeed is supported by the interaction results. However, the failure to find main effects could suggest that a salience manipulation using preexisting norms is simply not as strong as a content manipulation such as that used in previous research (Louis et al., 2007). It is also the case that the items used to measure referent group norms may have themselves made salient some participants' referent group norm perceptions, further minimizing the effects, while at the same time reference to healthy eating guidelines (to which all participants were exposed) made salient an alternative healthy eating referent group norm. While it is of course true that a more powerful content manipulation would yield larger effects, it is striking that even subtle changes in the salience of real group norms impact on intentions in this data—harmfully. Following up the relative strength and alignment of norm content versus norm salience manipulations may be an important direction of future research, particularly given that both practical and ethical concerns often preclude manipulating norm contents, and that many current intervention campaigns implicitly and explicitly make salient referent group norms, both positive and negative.

As noted above, the predicted interaction between the positive injunctive norm and the negative descriptive norm was evident for intentions (H8) (but not behavior; H9). When the negative descriptive norm was made salient, the effect of the positive injunctive norm was eliminated such that participants actually reported lower intentions to eat healthily. This finding suggests that making salient a negative descriptive norm can have harmful effects on an individual's intentions, and is consistent with the findings from Manning (2009) who found that the injunctive and descrip-

tive norms interact to predict intentions over and above that predicted by the TPB model. Moreover, the pattern of the interaction is consistent with the findings in Smith and Louis' (2008) Study 2 where an unsupportive descriptive norm eliminated the beneficial impact of a positive injunctive norm on intentions to sign a petition (see also, Smith et al., 2012), and in contrast to the findings of researchers who have observed that a supportive injunctive norm can buffer against the harmful effects of a negative descriptive norm (e.g., Cialdini et al., 1990). The present finding may indicate that the domain of healthy eating is not personally important or morally relevant enough to undergraduate students to evoke the motivating effects of norm conflict observed in Smith and Louis' (2008) Study 1. Alternatively, if health behaviors are assumed to be highly personally important, this may be evidence that the interactive effects of descriptive and injunctive norms operate differently for behaviors where more individual versus collective outcomes are salient. To us it seems likely that the relative importance of injunctive and descriptive norms when group norms conflict will be moderated by other factors, such as attitude to the behavior (e.g., participants may be more likely to act on the norm congruent with their attitude; McDonald, Fielding, & Louis, 2013, 2014). Prototypicality and centrality of the norms may also moderate, such that participants conform to whichever norm is judged more historically or currently group-relevant. These speculations await empirical testing.

Based on the findings from the current experiment, recommendations for future interventions and campaigns promoting healthy eating are unclear. Presenting participants with a positive injunctive norm (i.e., "Other students approve of eating healthily") and a conflicting negative descriptive norm (i.e., "Other students do not eat healthily") *reduced* their intentions to eat healthily. This suggests that exposing individuals to a salient negative descriptive norm is harmful when trying to create positive behavioral change, as individuals look to referent others when making decisions about their own behavior (Tajfel & Turner, 1979; Terry & Hogg, 1996). Nevertheless, the present research suggests that future campaigns and interventions should give careful consideration to the type and combination of normative messages presented.

Much emerging research draws attention to the likelihood of reactance against, or resistance to, normative interventions (e.g., Jaccard, Blanton, & Dodge, 2005; Keizer, Lindenberg, & Steg, 2011; Livingstone, Young, & Manstead, 2011; Schultz & Tabanico, 2009), although other research has shown long-standing effects (e.g., Perkins, Craig, & Perkins, 2011) and even generalization beyond the specified referent (e.g., Nolan, 2011). Even experts systematically misperceive the impact of normative campaigns (Blanton, Köblitz, & McCaul, 2008; Nolan, Kenefick, & Schultz, 2011). In the healthy

eating domain, the impact of norms has also been found to be attenuated by stress (Louis, Chan, & Greenbaum, 2009), while the impact of attitudes was heightened. The present data further attest to the complexity of outcomes possible.

It is the strength of the present research that a behavioral measure was included, as well as a no-norm control condition; few studies of manipulated normative influence have done so. Yet one weakness of the behavioral measure used in the current study is that we approach unhealthy eating as it has a linear relationship with health risks, where all unhealthy eating is problematic for an individual's health. However, low levels of unhealthy eating may not be particularly harmful; for example, the guidelines to which participants were exposed specified that 0–2 servings of high calorific foods are acceptable for a balanced diet. Therefore, if participants chose an unhealthy snack reward, it is unlikely that it would have been harmful to their health if the other food choices they made for the day were healthy. Future research should apply more sophisticated models of healthy and unhealthy eating that recognize the minimal risks of low levels of unhealthy eating. More broadly, the narrow snack measured here lacks measurement specificity; a multiple-act healthy eating criteria (e.g., measuring fiber, fruit, fat and other aspects of diet tapped in the questionnaire over the course of a day) would be expected to correlate more strongly with a global intentions measure.

Conclusions

The TPB model is widely used to predict individuals' intentions and subsequent behavior. However, the model has been criticized for its conceptualization of the subjective norm component (Cialdini et al., 1991), and its failure to consider the norms of important reference groups when predicting intentions (Terry & Hogg, 1996). The present research suggests partial support for an expanded TPB model that integrates a norm focus approach. In line with norm focus theory, the independent effects of the subjective injunctive and descriptive norms were identified when they were included as distinct and independent variables in the model. Furthermore, there is partial support for the utility of including referent group norms when predicting intentions as the manipulated student group norms interacted to predict intentions. Salient injunctive and descriptive norms interact to influence intentions, and in a way that bears directly on relevant policy debates. Despite some previous research suggesting the contrary, we find that making salient positive injunctive norms combined with negative descriptive norms undermine intentions; this is not an effective behavior change intervention. Identifying why individuals do or do not conform to referent group norms may enable researchers to devise more sophisticated and informed interventions for creating positive behavioral change in the context of health behaviors.

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