**Healthy Eating:**

**A Beneficial Role for Perceived Norm Conflict?**

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**Abstract**

Normative influence on dietary decision-making was assessed as a function of the referent informational influence model within an extended theory of planned behavior framework. In a longitudinal design, university students (*N* = 141) completed measures of attitudes, perceived behavioral control, subjective norms, referent group norms, and intentions toward healthy eating, with healthy eating behavior reported 2 weeks later (*n* = 82). A distinction was made between injunctive and descriptive norms, in line with norm focus theory. The extended theory of planned behavior and referent informational influence models were partially supported. An interaction between group injunctive and descriptive norms emerged such that misaligned group norms were associated with healthier eating behavior than aligned group norms (both supportive and unsupportive). Theoretical and applied implications are discussed.

*Keywords:* theory of planned behavior, referent groups, norm focus theory, injunctive norms, descriptive norms, healthy eating

Healthy Eating: A Beneficial Role for Perceived Norm Conflict?

The benefits of a healthy diet are extensive and widely known. Good nutrition contributes to long-term health and the prevention of chronic disease (Willett & Stampfer, 2013). Poor nutrition is linked to rising rates of overweight and obesity along with associated health problems such as cardiovascular disease, cancers, stroke, and diabetes (Australian Institute of Health and Welfare, 2008; Lock, Pomerleau, Causer, & McKee, 2004; Muurinen, Savikko, Soini, Suominen, & Pitkälä, 2015; Ness & Powles, 1997; World Health Organization, 2015). Total healthcare costs for obesity impose a substantial economic burden on individuals, families, and communities (Colagiuri et al., 2010). Chronic diseases related to poor nutrition are the cause of increasing numbers of deaths worldwide and are considered common, costly, and preventable (World Health Organization, 2014).

Widespread public health campaigns have been implemented to promote the benefits of a healthy diet and to encourage individuals to make healthy dietary decisions. Yet data reveals that the prevalence of obesity and health-related diseases is steadily increasing (Australian Bureau of Statistics, 2012; World Health Organization, 2015) indicating that many people continue to consume energy-dense nutritionally poor foods (Kelder, Perry, Klepp, & Lytle, 1994; Kelder, Perry, Lytle, & Klepp, 1995). Extensive educational interventions have failed to translate into dietary change on a broad level (Chadwick, Crawford, & Ly, 2013), highlighting the need for further research into the complex factors that influence food consumption. One avenue for future intervention involves the social context in which eating occurs. In this paper, we explore the social cues that shape decision-making in the context of healthy eating1 using norm focus theory and the referent informational influence model within the theory of planned behavior (TPB).

**The Theory of Planned Behavior**

The TPB is an influential model of behavioral decision-making. As an extension of the theory of reasoned action (Ajzen, 1985, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the TPB specifies intention to engage in a behavior as the key determinant of actual behavior, with intentions predicted by the belief that the behavior is good or bad (*attitudes*), the perception that others approve or disapprove (*the subjective norm*), and an evaluation of the behavior as easy or difficult (*perceived behavioral control*). According to the model, an individual is more likely to intend to and engage in a particular behavior if they have positive attitudes, a supportive subjective norm, and high perceived behavioral control.

The TPB successfully predicts behavioral decision-making from illicit drug use (McMillan & Conner, 2003) to donating money (Smith & McSweeney, 2007) or bone marrow (Hyde & White, 2013). It also predicts an array of pro-active health behaviors such as purchasing organic foods (Dean, Raats, & Shepherd, 2012), using sun protection (Bodimeade et al., 2014) and engaging in exercise (Armitage, 2005). In a review of 185 studies, the TPB model explained 39% of variance in intentions to engage in a health-related behavior (Armitage & Conner, 2001). In the specific domain of healthy eating, the TPB explains 43 - 57% of variance in intentions related to fruit consumption, vegetable intake and general healthy eating (e.g., Astrom & Rise, 2001; Bogers, Assema, Brug, Kester, & Dagnelie, 2007; Louis, Davies, Smith, & Terry, 2007; Povey, Conner, Sparks, James, & Shepherd, 2000), as well as successfully predicting actual eating behavior in many studies (e.g., Brug, De Vet, De Nooijer, & Verplanken, 2006; Karimi-Shahanjarini et al., 2012; Louis et al., 2007).

Although the TPB is considered superior to other behavioral decision-making models (Guillaumie, Godin and Vézina-Im, 2010), the normative component has been a consistently weaker predictor of overall healthy eating intentions than either attitudes or perceived behavioral control (Armitage & Conner, 2001). It also has appeared to exert little influence over intentions to consume fruit, vegetables, or genetically modified foods (Astrom & Rise, 2001; Bogers et al., 2007; Brug et al., 2006; Cook, Kerr, & Moore, 2002). Given that social norms are powerful determinants of behavior in other domains (Cialdini, Kalgren, & Reno, 1991; Smith, Louis, & Schultz, 2011), the limited efficacy of the normative component may be related to its conceptualisation within the TPB (Cialdini et al., 1991; Cialdini & Trost, 1998; Donald & Cooper, 2001). Specifically, while the subjective norm considers implicit social rules related to the perceived approval of others (*injunctive* *norms*), norm focus theory asserts that social influence is also based on perceptions of what others actually do (*descriptive norms*). Inclusion of the descriptive norm in the TPB accounts for an additional 5% of variance in intentions to engage in health-related behaviours such as cigarette smoking, alcohol consumption, and condom use (Rivis & Sheeran, 2003). In relation to healthy eating, the descriptive norm predicts intentions independently of the injunctive norm (e.g., Berg, Jonsson, & Conner, 2000; Povey et al., 2000) supporting their inclusion as distinct predictors in an extended TPB framework (Ajzen & Fishbein, 2005).

The TPB has also been criticised for overlooking the social cues provided by referent groups (Terry & Hogg, 1996). The referent informational influence model (Terry & Hogg, 1996; Terry, Hogg, & White, 1999) based on social identity theory (Tajfel & Turner, 1986) suggests that categorization of the self as a group member results in the internalization of norms that reflect group beliefs, attitudes, and behaviors. Group norms have been shown to predict intentions beyond the standard TPB model for health behaviors such as sun protection (Bodimeade et al., 2014), condom use (White, Terry, & Hogg, 1994), binge drinking (Johnson & White, 2003), and cigarette smoking (Moan & Rise, 2006). Furthermore, both group injunctive norms and group descriptive norms are considered unique predictors of intentions and behavior (Johnston & White, 2003; Louis et al., 2007; Rivis & Sheeran, 2003).

In addition to these direct effects, several studies have examined the interactive effect of injunctive and descriptive norms. Research has found that norm conflict can have a motivating influence on behavior. Early studies on littering found that although littering behavior increased after watching others litter, salient anti-littering cues inhibited this effect – that is, the injunctive norm suppressed the descriptive norm (Cialdini et al., 1990). Similarly, in the context of political activism, the perception that a group was highly supportive was associated with increased political intentions and behavior regardless of whether the group was seen as actually engaging in the behavior (Smith & Louis, 2008). McDonald, Fielding, and Louis (2013) found that strong pro-environmental attitudes paired with conflicting group norms motivated intentions to engage in pro-environmental behavior. Thus, an inconsistency in normative beliefs may function as a call to action under some conditions.

Other research, however, has found that norm conflict can reduce engagement in a behavior. Two studies examining the impact of group norms on pro-environmental intentions found that an unsupportive descriptive norm undermined the benefits of a supportive injunctive norm (Smith et al., 2012), such that unaligned norms were associated with lower intentions than even aligned unsupportive norms. In the domain of healthy eating, Staunton, Louis, Smith, Terry, and McDonald (2014) identified a toxic combination of norms whereby a supportive injunctive norm heightened the impact of an unsupportive descriptive norm. That is, perceiving that a group approved of healthy eating but did not eat healthily was associated with lower intentions than simply perceiving that they did not eat healthily—although this effect was not demonstrated for behavior, but only for intentions. Thus, norm misalignment may reduce pressure to conform to group norms at all (Göckeritz et al., 2010).

In sum, past research has demonstrated the need to consider how injunctive and descriptive norms interact to influence behavior. However, there is less agreement regarding the shape of these interactions: sometimes norm conflict is motivating, leading to increased engagement in the target behavior, but sometimes norm conflict is de-motivating, undermining action. Understanding when and why norm conflict produces particular effects on behavior is critical, not only to advance theory but also to facilitate the successful application of norms in behavior change interventions, such as in the domain of healthy eating. In order to do so, it is necessary to conduct more tests of descriptive and injunctive norm interactions on healthy eating outcomes.

Finally, despite research showing the impact of social norms on healthy eating, the majority of studies rely on cross-sectional designs and focus on intentions rather than behavior (Armitage & Conner, 2001; Louis et al., 2007). In a recent review of the healthy eating literature, Robinson (2015) identified the need for longitudinal assessment of dietary behavior as well as intentions, with a particular focus on measures of behavior that reflect normal everyday eating patterns. This is particularly relevant when considering the potential role of social norms in future interventions aimed at encouraging long-term healthy eating behavior.

**The Present Research**

The current paper considers normative influences in the context of typical everyday eating behavior. It examines the influence of referent group norms on healthy eating intentions and behavior in a longitudinal design, and incorporates norm focus theory into an extended TPB framework. Planned behavior variables, including both the subjective injunctive and descriptive norms, as well as referent group injunctive and descriptive norms and their interaction, are used to predict healthy eating intentions at Time 1 and self-reported eating behavior at Time 2. Based on previous TPB research (Astrom & Rise, 2001; Bogers et al., 2007; Brujin et al., 2007; Louis et al., 2007), we hypothesized that attitudes (H1), perceived behavioral control (H2), the subjective injunctive norm (H3a), and the subjective descriptive norm (H3b) would positively predict healthy eating intentions, and furthermore, that perceived behavioral control and intentions would positively predict healthy eating behavior (H4, H5). Consistent with the referent informational influence model (Terry & Hogg, 1996; Terry et al., 1999), we predicted that referent group norms would account for additional variance in intentions and behavior beyond that explained by the extended TPB model. Specifically, we hypothesized that the referent group injunctive norm and the referent group descriptive norm would positively predict healthy eating intentions (H6, H7) and behavior (H8, H9). In addition, based on previous research in the healthy eating domain (Staunton et al., 2014), we hypothesized that the referent group injunctive and descriptive norms would interact to predict intentions and behavior (H10, H11). No specific predictions were made as to the shape of the interaction due to inconsistent findings regarding the energizing or de-motivating effects of norm conflict in other domains (e.g., Cialdini et al., 1990; Göckeritz et al., 2010; Smith et al., 2012). Our study aims to address this gap in the healthy eating literature by considering the complex relationship between social cues occurring at multiple levels and their influence on intentions and behavior. Additionally, by examining the social context in which eating occurs, we explore mechanisms of influence that may be applied to broad-scale public health interventions to encourage healthier eating behaviors.

**Method**

**Design**

Attitudes, perceived behavioral control, and subjective injunctive and descriptive norms were measured at Time 1 and used to predict Time 1 intentions and Time 2 self-reported behaviors. Referent group injunctive and descriptive norms, and their interaction, were also tested as predictors of intentions and behavior. Age and gender were included as control variables.2

**Participants**

A sample of 141 Australian university students participated in the study at Time 1 for either course credit (*n* = 45) or a small chocolate bar (*n* = 96).3 Participants were 113 females (80%) and 28 males aged between 17 and 35 years (*M* = 19.31, *SD* = 2.85). Of these, 82 (58%) provided data at Time 2.

**Procedure**

First-year psychology students were recruited through a web-based system on the basis of course credit. All other participants were randomly approached at an Australian university campus and invited to participate in exchange for a small snack. Participants were informed in writing that participation was voluntary and that they were free withdraw at any time without penalty. They were also advised that anonymity would be maintained through the use of a unique identification code to link data collected at Time 1 and Time 2.

Participants completed measures of referent group injunctive and descriptive norms, demographic information, and theory of planned behavior items related to healthy eating (i.e., attitudes, perceived behavioral control, subjective injunctive and descriptive norms, and intentions). 4 Participants were debriefed verbally and provided an information sheet with further details about the background and nature of the study. For Time 2, participants were emailed two weeks after Time 1 with an invitation to complete an online questionnaire. This contained self-report measures of their dietary behavior in the preceding two weeks.

**Measures**

**Demographics.** Participants provided their age in years and their gender (coded as -1 = male and +1 = female).

**Attitudes.** Three items adapted from Ajzen (2006) assessed healthy eating attitudes (e.g., “When you personally think about avoiding unhealthy eating during the next two weeks, do you consider avoiding unhealthy eating behaviors to be”: -3 = *very bad* to +3 = *very good*). Responses were averaged with higher scores indicating more positive attitudes toward healthy eating, α = .71.

**Perceived behavioural control.** Four items adapted from Ajzen (2006) assessed participants’ perceived control over eating healthily (e.g., “How much control do you believe you have over avoiding unhealthy eating behaviors during the next two weeks?”) with corresponding response options on a 7-point scale (e.g., -3 = *no control at all* to +3 = *complete control*). Items were averaged with higher scores indicating higher perceived control over eating healthily, α = .73.

**Subjective norms.** Three items adapted from Ajzen (2006) assessed subjective injunctive norms (e.g., “People who are important to me *expect* me to avoid eating unhealthily during the next two weeks”: -3 = *very unlikely* to +3 = *very likely*). Responses were averaged with higher scoring indicating that significant others approved of healthy eating, α = .57.

Similarly, three items adapted from Povery et al. (2000) assessed subjective descriptive norms. Two items were measured on a 7-point scale (e.g., “Most people who are important to me will avoid unhealthy eating themselves during the next two weeks”: -3 = *very unlikely* to +3 = *very likely*) and one item was measured on an 11-point scale (i.e., “What percentage of the people whose opinions are important to you, do you estimate will avoid eating unhealthily during the next two weeks”: 0% to 100%). This item was rescaled to a -3 to +3 scale, and responses were averaged with higher scores indicating that significant others were perceived as eating healthily, α = .75.

**Group norms.** Three items adapted from Astrom and Rise (2001) and Moan and Rise (2006) assessed group injunctive norms identifying other university students as the referent group (i.e., “Most [university X] students would *think that I should* avoid unhealthy eating behaviors during the next two weeks”, “Most [university X] students would *expect* me to avoid unhealthy eating behaviors during the next two weeks”, and, “Most [university X] students would *approve* if I avoided unhealthy eating behaviors during the next two weeks”: -3 = *very unlikely* to +3 = *very likely*). Responses were averaged with higher scores indicating that the referent group approved of healthy eating, α = .66.

Similarly, three items adapted from Astrom and Rise (2001) and Povey et al. (2000) assessed group descriptive norms. Two items were measured on a 7-point scale (i.e., “[university X] students will avoid unhealthy eating behaviors themselves during the next two weeks”, and, “I would expect the average [university X] student to avoid unhealthy eating behaviors during the next two weeks”: -3 = *very unlikely* to +3 = *very likely*) and one item was measured on an 11-point scale (i.e., “What percentage of [university X] students do you estimate will avoid eating unhealthily during the next two weeks”: 0% to 100%). This item was rescaled to a -3 to +3 scale, and responses were averaged with higher scores indicating the referent group was perceived as eating healthily, α = .75.

**Intentions.** Three items adapted from Ajzen (2006) assessed healthy eating intentions (e.g., “I intend to avoid eating unhealthily during the next two weeks”: -3 = *strongly disagree* to +3 = *strongly agree*). Responses were averaged with higher scores indicating stronger intentions to eat healthily, α = .81.

**Time 2 behavior.** Ten items based on the Dietary Guidelines for Australian Adults (National Health and Medical Research Council, 2003) were used to measure healthy eating behavior over the preceding two weeks (i.e., eating 5 serves of vegetables, eating 2 serves of fruit, eating 2 serves of reduced fat milk or alternatives, not consuming full fat milk, eating some high fiber cereal or wholegrain bread, eating one serve of lean meat or alternatives, not eating fatty meats, not eating deep fried foods, not consuming more than two energy drinks, limiting soft drinks) with responses on a 7-point scale (1 = *never* to 7 = *every day*). Items were averaged with higher scores indicating greater healthy eating behavior, α = .65.

**Results**

**Preliminary Analyses**

Means, standard deviations, and zero-order correlations for the variables are presented in Table 1. Overall, the participants held positive attitudes towards healthy eating and perceived high behavioral control. They believed that their significant others approve of healthy eating (i.e., positive subjective injunctive norm) but perceived that their diet was mixed (i.e., neutral subjective descriptive norm). They also believed other students approve of healthy eating (i.e., positive group injunctive norm) but perceived that other students ate unhealthily (i.e., negative group descriptive norm).

Consistent with the theory of planned behavior, intentions were correlated with attitudes, perceived behavioral control, and the subjective injunctive and descriptive norms. In addition, intentions at Time 1 were positively associated with self-reported behavior at Time 2. The TPB variables were moderately intercorrelated, however, given the clear theoretical distinction between the variables within the TPB they were retained as unique predictors in the analyses (Ajzen, 1991; see also Cialdini et al., 1991; Manning, 2009). Group injunctive norms were not correlated with group descriptive norms, supporting their inclusion as theoretically distinct unique predictors.

**Regression Analyses**

Two hierarchical multiple regression analyses regressed intentions and healthy eating behavior upon the predictor variables. Block 1 included the control variables (age and gender), the TPB variables (attitudes, perceived behavioral control, and subjective injunctive and descriptive norms), and the direct effects of group injunctive and descriptive norms. When predicting healthy eating behavior, intentions were also included in Block 1 in line with the TPB. The two-way interaction of group injunctive and descriptive norms was entered in Block 2. Prior to conducting the analyses, all continuous predictor variables were mean-centered to reduce potential multicollinearity with the interaction term. Results are shown in Table 3.

**Predicting intentions.** In Block 1, the model accounted for 33% of variance in healthy eating intentions, *F*(8, 130) = 7.91, *p* < .001. Greater perceived behavioral control was associated with stronger intentions (β = .38, *p* < .001, *sr*2 = .11), as was the perception that significant others ate healthily (β = .22, *p* = .009, *sr*2 = .04), and that other students approved of eating healthily (β = .16, *p* = .047, *sr*2 = .02). No other variables were significant predictors (βs < .13, *p*s > .121, *sr*2 < .01). The inclusion of the interaction term in Block 2 did not account for additional variance in intentions, *R*2*ch.* = .01, *F ch.*(1, 129) = 1.10, *p* = .297, β = .08. The final model accounted for 33% of variance in healthy eating intentions, *F*(9, 129) = 7.16, *p* < .001.

**Predicting behavior.** In Block 1, the model accounted for 29% of variance in healthy eating behavior, *F ch.*(9, 72) = 3.27, *p* = .002. Greater perceived behavioral control at Time 1 was associated with healthier eating behavior at Time 2 (β = .32, *p* = .010, *sr*2 = .07). Similarly, stronger Time 1 intentions predicted subsequent self-report healthier eating behavior at Time 2 (β = .31, *p* = .018, *sr*2 = .06). No other variables were significant predictors of behavior (βs < .19, *p*s < .145, *sr*2 < .02).

In Block 2, the inclusion of the interaction term accounted for an additional 5% of variance in healthy eating behavior, *F ch.*(1, 71) = 4.94, *p* = .029, β = -.24. Simple slopes of the group injunctive norm at high and low values of the group descriptive norm (one *SD* above and below the mean, respectively) are presented in Figure 1. When descriptive norms were less supportive of healthy eating, the group injunctive norm had no effect on healthy eating behavior (β = .18, *p* = .290, *sr*2 = .01). When descriptive norms were more supportive, more positive group injunctive norms were (ironically) marginally associated with less healthy eating behavior (β = -.26, *p* = .071, *sr*2 = .03). Overall, the final model accounted for 34% of the variance in healthy eating behavior, *F*(10, 71) = 3.60, *p* = .001.

**Discussion**

The present study investigated the influence of social norms on decision-making in the domain of healthy eating. We used an extended TPB framework and the referent informational influence model in a longitudinal design to predict participants’ healthy eating intentions and behavior. In line with norm focus theory, a distinction was made between injunctive and descriptive norms at both the subjective and group levels. We also considered their interaction at the group level to examine the effect of referent group norm conflict on dietary decision-making. Partial support was found for the extended TPB model with the subjective descriptive norm and perceived behavioral control predicting healthy eating intentions, and perceived behavioral control and intentions predicting healthy eating behavior. The referent informational influence model was also supported with group injunctive and descriptive norms playing a role to predict healthy eating behavior (see also, Louis et al., 2007). Moreover, the two types of norms interacted, with perceived conflict apparently associated with greater self-report behavior, as discussed below.

**The Theory of Planned Behavior**

This study contributes to the literature supporting the TPB as a predictor of healthy eating intentions and behavior (e.g., Astrom & Rise, 2001; Bogers et al., 2007; Staunton et al., 2014). The extended TPB model, including both subjective injunctive and descriptive norms, accounted for 14% of variance in intentions and 19% of variance in behavior. Perceived behavioral control and the subjective descriptive norm were unique predictors of healthy eating intentions as hypothesized (H2, H3b), however attitudes and the subjective injunctive norm were not (H1, H3a). In addition, perceived behavioral control and intentions predicted behavior two weeks later (H4, H5). Consistent with the TPB model (Ajzen, 1985, 1991), participants who perceived greater control over healthy eating and believed that significant others engaged in healthy eating reported stronger intentions to eat healthily. Correspondingly, participants with greater control and stronger intentions to eat healthily reported healthier eating behavior two weeks later. This builds on the consistent association between norms and intentions shown in cross-sectional studies (e.g., Staunton et al., 2014), and demonstrates a clear (longitudinal) link between normative beliefs related to eating and everyday dietary behavior.

Our results showed that neither participants’ attitudes towards healthy eating nor their perception of significant others’ approval of healthy eating predicted their healthy eating intentions. However, it is not uncommon to find partial support for the TPB predictors in some domains (e.g., Bodimeade et al., 2014; Louis, Chan, & Greenbaum, 2009). Although attitudes typically account for significant variance in intentions for a range of health behaviors (Armitage & Connor, 2001), Fishbein and Ajzen (1975) suggested that the relative predictive strength of attitudes and norms would vary. For instance, a weak effect of attitudes was found for sun protection behavior when there was high identification with the referent group (Terry & Hogg, 1996), and, for conservation behavior, when there was lower perceived effectiveness of engaging in that behavior (McDonald et al., 2013). The positive correlation between attitudes and intentions at the bivariate level (Table 1) is consistent with the basic principles of the planned behavior model.

Our results also support the use of norm focus theory to distinguish between injunctive and descriptive norms within an extended TPB framework. In a meta-analysis involving 196 studies, Manning (2009) found that descriptive norms were a consistently stronger predictor than injunctive norms. Indeed, our results showed that beliefs about significant others’ healthy eating behavior were associated with healthy eating intentions, while perceptions of whether significant others approved of healthy eating were not (see also Stok, Ridder, Vet, & Wit, 2014). The theoretical distinction between these normative aspects is relevant to applied interventions, and highlights the need to focus on descriptive norms in relation to behavioral change.

A somewhat different pattern of results emerged for injunctive and descriptive referent group norms. Group norms were found to predict intentions over and above the standard TPB model, thus supporting the utility of the referent informational influence model. In this case, however, the group injunctive norm was associated with intentions (H6), while the group descriptive norm was not (H7). Although an unexpected finding, this highlights the importance of considering multiple normative aspects from a range of relevant sources, particularly in the domain of healthy eating. If taken at face value the dissociation could arise from the fact that individuals often eat with significant others, and so what they do is more salient that what they approve of: descriptive norms become more important. At the group level, injunctive norms might be more important because group members have more confidence in their appraisal of the level of approval for healthy eating, compared to their appraisal of the extent to which others are actually doing it in their homes. These empirical hypotheses require testing, however.

At the behavioral level, perceived behavioral control and healthy eating intentions were found to be strong predictors of self-report healthy eating two weeks’ later. This is consistent with Armitage and Connor’s (2001) meta-analysis as well as the TPB model itself (Ajzen, 1985, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The referent informational influence factors did not independently predict behavior (H8, H9) suggesting that any effects of referent group norms are mediated through intentions. However, consistent with work that suggests it is vital to look at the interaction of referent group norms (Smith & Louis, 2009; Smith et al., 2012; Staunton et al., 2014), and to consider behavior as well as intentions (Louis et al., 2007; Robinson, 2015), the interaction of group injunctive and descriptive norms was significant on behavior (H11) but not intentions (H10). Specifically, the group injunctive norm had no effect on behavior when descriptive norms were unsupportive of healthy eating, but was actually associated with *less* healthy eating behavior when descriptive norms *supported* healthy eating.

The shape of the interaction observed here does not support the argument that either injunctive or descriptive norms always dominate (e.g., Cialdini et al., 1990; Smith & Louis, 2008); rather it highlights a possible benefit of perceived norm conflict in motivating healthy eating behavior. Other research has suggesting that conflicting norms can mobilize political action (Smith & Louis, 2008) or environmental action (McDonald et al., 2013). In these domains, discovering that others do not “practice what they preach” may communicate the need for the individual to take action to achieve collective goals. However, the present research highlights that misaligned group norms can be mobilizing for behavior that has impact primarily at the individual level: healthy eating. Indeed, our results suggest the possibility that misaligned norms may be more mobilizing for long term behavior than even aligned supportive norms in relation to healthy eating.

At first glance, our results might appear to be in conflict with those of Staunton and colleagues (2014), who also examined the interplay between descriptive and injunctive norms on healthy eating but found that norm conflict undermined intentions (but not behavior) to eat healthily. However, there are several points that should be noted in comparing the studies. First, in Staunton et al. norms were manipulated, such that participants were exposed to a supportive injunctive norm message, an unsupportive descriptive norm message, a conflicting norm message, or no norm message at all. Although this design enabled the effects of norms (and a conflicting norm) to be tested against a control condition, it did not test the effects of the other ways in which norms can conflict on intentions and behavior, or compare the effects of misaligned messages to aligned messages. Second, the present research measured norm perceptions rather than manipulating norms. Experimental manipulations of norms do provide greater control, but the use of perceived authentic norms is essential to determining their influence on behavior over time. Finally, while Staunton et al. failed to find interactive effects on behavior assessed at the end of their study (i.e., participants’ selection of healthy versus unhealthy snack), the present research did find effects on behavior measured longitudinally.

As a final comment on the impact of misaligned norms, such norms are expected to be motivating, according to McDonald and colleagues, when commitment to the behavior is comparatively high. For these respondents, perceived norm conflict may function as a “call to arms” (other students are not eating well though they should!). In addition, the degree of conflict may reflect participants’ perceptions of stricter standards: it is participants who see the group’s injunctive norm as the most rigorous (and who are influenced by that) that may perceive the most discrepancy from a moderate descriptive norm. These possible mechanisms need to be addressed empirically, especially since other research has found that misaligned norms may de-motivate or paralyze individuals who are less committed (McDonald et al., 2014). Given that the impact of conflicting norms may not be consistent for intentions and behavior, it will be of critical importance to consider differential patterns on intentions and behavior, ideally longitudinally, in future normative research in the domain of healthy eating. It should be noted that other researchers have also found that descriptive norm messages had effects on eating behavior in the absence of effects on intentions. For example, Stok and colleagues (2014) observed that descriptive norm messages failed to influence immediate intentions, but did influence self-reported behavior 48 hours later. Like Stok and colleagues, we believe that this pattern reflects the way in which descriptive norms sometimes may help people to reach decisions without conscious effort or awareness. Given that people may often form good intentions to eat healthily yet fail to translate such intentions into behavior, the presence of effects of descriptive norms on behavior points further to the potential of such norms in behavior change efforts

**Strengths and Limitations**

Despite some controversy surrounding the use of self-report measures of food consumption, the present study benefited from an assessment of eating behavior based on current healthy eating guidelines. A review of the validity of adolescents’ self-reported dietary intake found that this type of food frequency measure was comparable to daily diary methods (which are completed after each instance of food consumption) and was moderately correlated with data obtained through interview with a dietician (Brener, Billy, & Grady, 2003). Further research may wish to extend this self-report data to an objective measure of eating behavior, although the practical difficulty of accurately assessing typical everyday eating behavior will need to be considered. This is particularly important given that the use of a chocolate bar as an incentive for participation at Time 1 may have made salient unhealthy eating intentions for some respondents, reducing intention-behavior correspondence. Use of a non-food-related incentive should be considered in future research.

Although normative aspects have been manipulated experimentally in other research (e.g., Smith & Louis, 2008; Smith et al., 2012; Staunton et al., 2014), the use of perceived authentic norms is essential to determining their influence on behavior over time. The longitudinal design of the current study allowed an assessment of referent group norms that were salient and relevant to the individual. Two norm sources were considered in terms of injunctive and descriptive aspects: the norms of significant others (i.e., *subjective norms*) and of other students (*referent group norms*). However, social cues to guide decision-making may also come from other salient referent groups. Norms from multiple sources have been shown to affect environmental intentions and behavior (McDonald et al., 2013; McDonald et al., 2014) suggesting that further research in the domain of healthy eating may consider the impact of norm congruence and conflict occurring at several levels simultaneously. For instance, while we considered the student referent group, other sources of influence include general friendship groups, work colleagues, or the local community. These alternative groups may provide a foundation for applied interventions to improve the nutritional status of specific groups at high-risk of weight-related health problems.

**Conclusions**

This study considers the complex social cues that influence intentions and behavior in the domain of healthy eating. It provides support for the utility of an extended TPB model incorporating norm focus theory in predicting healthy eating intentions and behavior. The distinct nature of descriptive and injunctive norms, and their differential effects on intentions and behavior, provides avenues for future research and practical interventions. In addition, the results highlight the importance of considering the influence of norms occurring at multiple levels. The power of referent group norms may be particularly relevant in designing public health interventions where social cues can be used to reach large groups of people, while the beneficial effect of norm conflict in motivating health eating may provide the impetus to instigate broad-level dietary change and to combat the increasing prevalence of obesity and health-related disease.

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**Footnotes**

1 Dietary choices in this study were conceptualized in terms of following or failing to follow current health guidelines in Australia (i.e., [not] eating 5 serves of vegetables, 2 serves of fruit, 2 serves of reduced fat milk or alternatives, some high fibre cereal or wholegrain bread, 1 serve of lean meat or alternatives each day, and [not] consuming full fat milk, eating fatty meats, eating deep fried foods, consuming more than 2 energy drinks a day, or limiting intake of soft drink). For ease of interpretation, we refer to healthy eating rather than not eating unhealthily in this study.

2 This study was part of a broader research program which also included measures of cultural orientation, identification with the referent group, a Time 1 observed behaviour, and Time 2 intentions. Further details can be obtained from the corresponding author.

3 The irony of this incentive has not escaped our notice. It is possible that the choice artificially made salient unhealthy intentions among some respondents. We return to this point in the discussion.

4 At this time, each participant was randomly assigned one of two questionnaire versions which framed the negative consequences of eating unhealthily as family-focused or self-focused. This manipulation was designed to test the effect of framing, and to assess whether the effect of family- or self-focus frame was moderated by cultural orientation. No effects were observed. The study also included an attempt to manipulate the relative normative focus to referent group injunctive norms, referent group descriptive norms, or a control condition where no normative information was provided. Manipulation checks indicated that the norm focus manipulations were not effective. Accordingly we present the correlational (cross-sectional) analyses in the paper above. Full details are available on request.

Table 1

*Means, Standard Deviations, and Correlations Among the Variables*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | ***M*** | | **SD** | | **1** | | **2** | | **3** | | **4** | | **5** | | **6** | | **7** | | **8** | | **9** |
| 1. Age (17-35) | 19.05 | | 2.25 | |  | |  | |  | |  | |  | |  | |  | |  | |  |
| 2. Gender (-1 = men, 1 = women) | 0.68 | 0.73 | | -.08 | |  | |  | |  | |  | |  | |  | |  | |  | |
| 3. Attitudes (-3 to +3) | .92 | 1.15 | | .18† | | .15 | |  | |  | |  | |  | |  | |  | |  | |
| 4. Perceived behavioural control (-3 to +3) | 1.35 | 0.97 | | .17 | | .04 | | .38\*\*\* | |  | |  | |  | |  | |  | |  | |
| 5. Subjective injunctive norm (-3 to +3) | .73 | 1.16 | | -.03 | | .05 | | .02 | | .26\* | |  | |  | |  | |  | |  | |
| 6. Subjective descriptive norm (-3 to +3) | -.01 | 1.22 | | -.13 | | .02 | | .07 | | .20† | | .36\*\* | |  | |  | |  | |  | |
| 7. Group injunctive norm (-3 to +3) | .32 | 1.18 | | .12 | | .14 | | .11 | | .25\* | | .48\*\*\* | | .32\*\* | |  | |  | |  | |
| 8. Group descriptive norm (-3 to +3) | -.32 | 1.03 | | .00 | | .07 | | .08 | | .12 | | .19† | | .35\*\* | | .16 | |  | |  | |
| 9. Intentions (-3 to +3) | 1.01 | 1.14 | | .11 | | -.07 | | .25\* | | .50\*\*\* | | .22\* | | .38\*\*\* | | .35\*\* | | .25\* | |  | |
| 10. Eating behaviour at Time 2 (1-7) | 5.62 | 0.74 | | -.03 | | .13 | | .26\* | | .42\*\*\* | | .01 | | -.03 | | .03 | | .00 | | .35\*\* | |

*Note.* †*p* < .10; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Table 2

*Hierarchical Regression Analysis of Healthy Eating Intentions and Behaviour*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Intentions (β)** | | **Healthy eating behaviour (β)** | |
|  | **Block 1** | **Block 2** | **Block 1** | **Block 2** |
| Age | .05 | .05 | -.13 | -.13 |
| Gender (-1 = men, 1 = women) | -.12 | -.13† | .14 | .15 |
| Attitudes | .07 | .06 | .09 | .10 |
| Perceived behavioural control | .38\*\*\* | .38\*\*\* | .32\* | .35\*\* |
| Subjective injunctive norm | .05 | .05 | -.04 | -.05 |
| Subjective descriptive norm | .22\*\* | .20\* | -.18 | -.18 |
| Group injunctive norm | .16\* | .16\* | -.09 | -.04 |
| Group descriptive norm | -.02 | -.01 | -.05 | -.00 |
| Intentions | - | - | .31\* | .36\*\* |
| Group injunctive \* descriptive norm interaction |  | .08 |  | -.24\* |
| *R*2ch. | .33\*\*\* | .01 | .29\*\* | .05\* |
| Final model *R*2 |  | .33\*\*\* |  | .34\*\* |

*Note.* †*p* < .10.\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

*Figure 1.*The effect of group injunctive norm on healthy eating behaviour as moderated by group descriptive norm. Note that low and high values of the moderator were calculated as 1 *SD* below and above the mean, respectively. Error bars represent standard errors.