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**DOI**

[10.1016/j.appet.2013.01.020](https://doi.org/10.1016/j.appet.2013.01.020)

**Publication date**

2013

**Document Version**

Final published version

**Published in**

Appetite

[Link to publication](#)

**Citation for published version (APA):**

Mollen, S., Rimal, R. N., Ruiters, R. A. C., & Kok, G. (2013). Healthy and unhealthy social norms and food selection: findings from a field-experiment. *Appetite*, 65, 83-89. <https://doi.org/10.1016/j.appet.2013.01.020>

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## Research report

# Healthy and unhealthy social norms and food selection. Findings from a field-experiment



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## ARTICLE INFO

## Article history:

Received 9 March 2012

Received in revised form 10 January 2013

Accepted 21 January 2013

Available online 10 February 2013

## Keywords:

Social norm  
Injunctive norm  
Descriptive norm  
Food choice  
Field-experiment

## ABSTRACT

The behavior of others in people's social environment (i.e., descriptive norms), as well as their opinions regarding appropriate actions (i.e., injunctive norms) strongly influence people's decisions and actions. The goal of this study was to extend prior laboratory research on the influence of social norms on food choices, by conducting a field-experiment in an on-campus food court. One of three different messages was posted on a given day: a healthy descriptive norm, healthy injunctive norm, or an unhealthy descriptive norm. Effects of these social norms messages on food choice were compared against each other and a no-message control condition. In total, 687 students reported their food choice through a questionnaire provided to them. Food choices were analyzed for participants who reported being exposed to one of the social norms signs and those in the control condition ( $N = 220$ ). Findings showed that the healthy descriptive norm resulted in more healthy food choices, compared to an unhealthy descriptive norm, as well as the control condition. The difference between the injunctive healthy norm and the control condition was not significant, though those in the injunctive norm condition did make more healthy decisions, than those in the unhealthy descriptive norm condition. Implications with regard to theory and practice are discussed.

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## Introduction

Globally, more than 1.4 billion adults are overweight, and more than one third of them are obese, with a body mass index higher than 30 (World Health Organization [WHO], 2012). The chance of incurring health risks such as diabetes and cardiovascular diseases grows with increasing overweight (WHO, 2012). As a result of the increase in overweight and obesity incidence rates, more and more social circles include people who are overweight, as obesity spreads through social networks (Christakis & Fowler, 2007). These changes in the social environment may make it more difficult for people to maintain a healthy diet, because if others in their social circle are consuming unhealthy, yet tasty foods, they have less incentive to act differently. Unhealthy social norms provide people with no reason to change and may even encourage those who have a healthy diet to eat less healthy in an attempt to conform to the majority (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). On the other hand, the social environment may also play a positive role in the initiation and maintenance of healthy diets through the provision of social support (Uchino, Cacioppo, & Kie-

colt-Glaser, 1996) or by setting the right example for others (Burger et al., 2010).

Ultimately, to reduce problems with overweight and obesity, behavior changes need to be made. Some key behaviors in this regard include increasing fruit and vegetable intake and reducing the consumption of fatty foods (WHO, 2012). Reducing caloric intake by 100 calories a day by, for example, replacing a hamburger with a salad, can significantly offset weight gain (Hill, Wyatt, Reed, & Peters, 2003). Investigating positive and negative influences regarding food choice stemming from the social environment is imperative, as it can provide a key to accelerate behavior changes in the midst of an increasing trend in overweight and obesity.

## Descriptive norms

The behavior of others in our social environment (i.e., descriptive norms) strongly influences our own decisions and actions (e.g., Burger & Shelton, 2011; Cialdini, Reno, & Kallgren, 1990; Keizer, Linderberg, & Steg, 2008; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). Descriptive norms are thought to influence behavior because they provide information about the correct way to act in a certain situation and thereby serve people's goal of accuracy: "if a lot of people are doing it, it must be right" (Cialdini, 1984; Cialdini & Goldstein, 2004; Jacobson, Mortensen, & Cialdini,

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2011). It is because descriptive norms provide social proof that they often function as shortcuts (i.e., heuristic cues) in the decision-making process and thereby influence our behavior especially at low levels of effortful cognitive activity (Cialdini, 1984; Jacobson et al., 2011).

Healthy and unhealthy descriptive norm perceptions have been found to be positively associated with healthy and unhealthy food intake, respectively (Lally, Bartle, & Wardle, 2011). Similarly, they also affect intentions to consume healthy foods (Smith-McLallen & Fishbein, 2008) and adopt a healthy diet (Yun & Silk, 2011). Additionally, experimental evidence indicates that descriptive norms influence actual food choices people make (Burger et al., 2010). Burger et al. (2010; study 1) found that participants who were made to believe that others before them had made healthy food choices also tended to make more healthy choices themselves (67.5%), compared to when participants were made to believe that others before them had made unhealthy food choices, in which case less than half of the participants made a healthy choice (40.0%). In a control group that received no normative information, a little over half of the participants chose to have a healthy snack (55.0%). These findings were replicated in a second experiment.

The goal of the current study was to extend prior findings from cross-sectional and laboratory studies by investigating the effects of healthy and unhealthy descriptive norm messages on food choice within a naturalistic setting. Studying the effects of social norms in a field-setting is crucial for theory development as well as practice, as it increases external validity of findings, even though, compared to controlled laboratory-based studies, internal validity may be somewhat compromised (Cook & Campbell, 1979). This naturalistic approach aligns with and extends prior research on both social norms (e.g., Cialdini et al., 2006; Goldstein, Cialdini, & Griskevicius, 2008; Schultz et al., 2007) and food choice (e.g., Lowe et al., 2010; Wansink & Kim, 2005).

### *Injunctive norms*

In social psychology a distinction is made between descriptive and injunctive norms. While descriptive norms refer to the behavior of most others in our social environment, injunctive norms describe the conduct that most others approve or disapprove of (Cialdini et al. (1990). Injunctive and descriptive norms may align, but they may also be in conflict and interact to guide behavior (e.g., Schultz et al., 2007; Smith & Louis, 2008). In contrast to descriptive norms, injunctive norms are most influential under conditions of high effortful cognitive activity. This relates to the goal that underlies the effectiveness of injunctive norms. Injunctive norms are thought to be effective because they serve people's goal of affiliation. Through strategic action, such as conforming to injunctive norms, people aim to obtain social approval and avoid disapproval and other negative social sanctions (Cialdini & Goldstein, 2004; Cialdini et al., 1990; Deutsch & Gerard, 1955). However, that what is socially desirable may not always be personally desirable, as a result of which a conflict may arise between intrapersonal and interpersonal goals. This conflict requires effortful cognitive activity to resolve; therefore, injunctive norms have been found to be more influential when self-regulatory resources are high (Jacobson et al., 2011).

While injunctive and descriptive norms differ in the processes that underlie their effectiveness, both perceptions regarding food consumption and dieting behaviors of most others (i.e., descriptive norms), as well as perceptions regarding others' approval related to food consumption and dieting (i.e., injunctive norms) have been found to predict intentions to consume healthy foods and pursue a healthy diet (Smith-McLallen & Fishbein, 2008; Yun & Silk, 2011). In addition to investigating the effects of descriptive norms in a naturalistic environment it is therefore of interest to examine

the external validity of findings pertaining to the influence of injunctive norms on food choice.

### *Current study*

In the current study, the effects of normative messages (i.e., healthy descriptive, unhealthy descriptive, and healthy injunctive norms) on food choice were tested in a naturalistic environment. In line with previous studies that have investigated the negative effects of messages describing the high prevalence of undesirable behaviors (Burger et al., 2010; Cialdini et al., 2006), or low prevalence of desirable behaviors (Lapinski, Rimal, DeVries, & Lee, 2007; Sieverding, Decker, & Zimmermann, 2010), our expectation was that an unhealthy descriptive norm message, communicating the high prevalence of unhealthy food choices, would result in more unhealthy food choices, compared to both a no-message control condition and healthy social norm messages (both descriptive and injunctive). We also predicted that both healthy norm messages (i.e., descriptive and injunctive) would result in more healthy food choices, compared to both the control condition and the unhealthy descriptive norm message.

## **Method**

### *Field setting*

The setting for this study was an on-campus food court, open on weekdays during lunch hours (11 AM–2 PM). In order to study the effects of healthy descriptive norms, unhealthy descriptive norms and healthy injunctive norms within a single setting, the healthy and unhealthy descriptive norm message described the high prevalence of either a healthy or an unhealthy food choice, respectively. The injunctive norm message communicated approval related to healthy food choices. In the food court, a variety of food options that varied in healthfulness were offered. Choices included salads (served in the tossed salad area) and hamburgers (grill area). These two establishments were placed across from each other in the food court and offered lunch at about the same price. This made salads (as a healthy food option) and hamburgers (as an unhealthy food option) ideal for studying the effects of healthy and unhealthy descriptive norms on students' food choice. Taking this approach allowed the study to be administered in one location, keeping all other circumstances as constant as possible, thereby reducing the impact of confounding variables.

### *Participants*

A total of 729 people who visited the food court at the campus of an eastern private university in the United States agreed to participate in this field study. To promote homogeneity in the sample and because the descriptive normative messages pertained to behaviors of students, only regular students at the university were included. Forty-two participants were excluded from the study because they were not students, but were, instead, staff members or visiting students. In the final sample of 687 students (336 men, 347 women, 4 no answer), 78.2% were born and raised in North America, 11.5% in Asia, 4.2% in Europe, 1.7% in Latin America, 1.5% in the Middle East, 0.7% in Africa, and 0.4% in Australia; 1.6% marked the *other* category. The age of participants ranged from 17 to 34 years old ( $M = 20.85$ ,  $SD = 2.52$ ). The procedure and materials were approved by the university's institutional review board. Upon completion of the field-experiment, the responsible researcher set up a stall in the food court for debriefing. People who came to the stall were debriefed and offered a choice of fruit or candy to thank them for their participation.

## Procedure and materials

The on-campus food court consisted of several separate food stations: a salad bar (e.g., tossed salads), pizzeria (e.g., pizzas, side salads), deli (e.g., sandwiches), “grab and go” (e.g., sandwiches, salads, sushi, soup), and a grill area (e.g., hamburgers, chicken tenders, fries). For the purpose of the study, only the salad bar and grill area were part of the experiment. These two food stations were chosen not only because of their close proximity, similarity in price, and popularity among students, but also because they differed substantially in their healthfulness.

In total, three social norm messages about hamburger and salad consumption were constructed, all of which started with the same header: “What are you having today?” This question was followed by the descriptive (healthy/unhealthy) or injunctive norm message. The unhealthy descriptive norm message pertained to the consumption of burgers; the two healthy social norm messages pertained to the consumption of tossed salads.

In order to align the descriptive norm messages with actual behavior, prior to the field study, the number of burgers and salads sold was counted on two consecutive days. On average, more than 50 salads and burgers were sold per hour. This means that each day during the three opening hours more than 150 hamburgers and salads were sold. Based on this finding the *unhealthy descriptive norm message* read “Every day more than 150 [name of university] students have a burger for lunch here”; this was accompanied by the university’s logo and two photos of the grill area. The *healthy descriptive norm message* read “Every day more than 150 [name of university] students have a tossed salad for lunch here”; this message was accompanied by photos of the salad bar and the university logo. The *injunctive norm message* also pertained to tossed salads, and read “Have a tossed salad for lunch!”; this is similar to the wording used for a positive injunctive norm in previous research by Cialdini et al. (2006) and indicates that having a salad for lunch is approved of by others. This poster also depicted the salad bar and the university’s logo. In the control condition no signs were posted. Accordingly, the four conditions were: healthy descriptive norms, unhealthy descriptive norms, healthy injunctive norms, and no-message control.

Each day one different norm message was posted (or no norm; control condition) during opening hours, and this was done for four consecutive weeks. The norms message was conveyed by means of four different signs posted at different locations in the food court. Two large signs of 24" × 36" were posted on an easel at both main entrances, and two small signs (11" × 17") were placed at the entrance to the grill and salad area. The order in which the norms were conveyed was counterbalanced to make sure each norm would be displayed each day of the week (Monday–Friday).

In this daily period of 3 h, during which the university food-court was opened, the experimenter aimed to distribute 40 questionnaires. In the first hour the experimenter aimed to hand out 10 questionnaires and in the second and third hour the goal was to hand out 15 questionnaires per hour. The investigator asked for participation in the study only from those who appeared to be within the age range of typical undergraduate students (between 18 and 22 years old) and those who were eating food purchased in the food court. Thus, excluded from the study were individuals who appeared to fall outside the age range and those who were consuming foods brought from outside. A final consideration was the size of the group in which potential participants were eating. Those eating alone or in small groups were asked to participate; this was done to ensure that participants did not have too many distractions. Decisions to hand out questionnaires, however, were not based on the type of food bought. Objective food choice counts indicated that random selection of participants was indeed successful (see section “Discussion”).

Participants were not allowed to participate in the study more than once. The first question presented on the questionnaire therefore asked whether participants remembered filling out a similar questionnaire in the last month. If so, they were instructed to stop filling out the survey. Eligible participants were thanked by the experimenter, given a questionnaire and pencil, and were instructed to drop the questionnaire in the drop-box upon exiting the food court.

## Measures

*Demographic variables*, such as gender, age, student classification and country of origin were assessed. *Food choice habits* were assessed by asking participants which of the establishments in the food court they visited most often (i.e., salad bar, pizzeria, deli, grab and go, meals in a minute, grill area, or other), which food item they ordered most often at this establishment (open-ended), and how healthy they perceived this choice to be (1 = *not at all healthy* – 7 = *very healthy*). The same questions were asked but rephrased for current food choice.

Food choice (open-ended) was recoded into two variables, one that reflected salad choice and another that reflected burger choice. Salad consumption was coded as “salad” only if the stipulated salad contained greens. Therefore, a hummus or chicken salad was not counted as a salad. Because salads were supposed to reflect a healthy choice, a combination of a salad with other food items such as a sandwich or pizza was not counted as a salad. A food choice was counted as a hamburger if it was referred to as a hamburger (or “burger”); because of their high caloric count this included vegetarian burgers, turkey burgers and chicken burgers, in addition to regular hamburgers. Other products bought in the grill area did not count as a burger, examples of which were chicken tenders, grilled cheese sandwiches and mozzarella sticks. The first author coded habitual and current food choices according to the same coding scheme and this was checked for accuracy by one of the coauthors; two flaws in the coding were uncovered and subsequently corrected.

*Norm perception* questions were asked to measure whether the social norm signs changed perceptions of social norms pertaining to both descriptive and injunctive norms. First, more generally, participants were asked whether they remembered seeing a sign upon entering the food court, and if so, whether they could reproduce the text on the sign. In addition, two questions were asked for descriptive norm perception. Students were asked to estimate how many students visiting the on-campus food court they thought ordered a tossed salad per day, and a hamburger per day. The injunctive norm was assessed by asking participants to rate, on a 7-point scale, the extent to which they disagreed or agreed with two statements: “most people think it is appropriate for me to order a (1) tossed salad, and (2) hamburger for lunch” (1 = *strongly disagree* – 7 = *strongly agree*).

## Results

### Norm manipulation

Out of a total of 687 students, 140 were in the control and 547 in the experimental conditions. Among those in the control condition, 119 (85%) correctly recalled not having seen a poster upon entering the cafeteria. A little over one fifth of those in the experimental conditions (21.9%;  $n = 120$ ) indicated seeing a poster upon entering the food court. Those who incorrectly recalled the message in the experimental conditions, as well as those who mistakenly reported seeing a sign in the control condition were removed from the main analyses; this resulted in a final sample

of 231 participants, corresponding to  $n = 119$ ,  $n = 33$ ,  $n = 42$ , and  $n = 37$ , in the control condition, healthy descriptive norm, healthy injunctive norm, and unhealthy descriptive norm condition, respectively. For the primary analyses, those who were not exposed were excluded because the interest was on understanding the effects of, not factors that enhance, exposure. This exclusion did not apply for the intention-to-treat analyses, which were performed on the full sample.

To check whether people indeed perceived hamburgers to be an unhealthy food item and salads a healthy food item, ratings of healthiness of food choice were compared by means of a univariate analysis of variance. Those who had a burger for lunch rated their food choice as less healthy ( $M = 3.00$ ;  $SD = 1.22$ ) than those who chose to have something else for lunch ( $M = 4.10$ ;  $SD = 1.58$ ),  $F(1,219) = 20.78$ ,  $p < .001$ ,  $\eta_p^2 = .09$ . In line with expectations, salads were perceived to be a healthier food option than other food choices ( $M_{salad} = 5.71$ ;  $SD_{salad} = 1.03$  vs.  $M_{other} = 3.39$ ;  $SD_{other} = 1.33$ ),  $F(1,219) = 113.30$ ,  $p < .001$ ,  $\eta_p^2 = .34$ .

To test whether *injunctive norm perceptions* were affected by the injunctive norm sign, pair-wise comparisons of the injunctive norm group with the control group were conducted. The  $F$ -tests showed no significant differences between the control and injunctive norm condition in perceived approval of ordering a salad for lunch,  $F < 1$ , nor for the perceived approval of ordering a hamburger for lunch,  $F(1,158) = 2.52$ ,  $p = .11$ ,  $\eta_p^2 = .02$ .

*Descriptive norms perceptions* varied quite a bit between people, with estimates as high as 600 salads and 1000 burgers sold per day. Therefore, before conducting any analyses, outliers ( $\geq 3SD$ ) were first removed (before calculating means and standard deviations to determine outliers, however, one highly extreme score was removed to minimize skewness). This meant that salad sales perceptions equal to or higher than 400 and burger sales perceptions equal to or higher than 600 were removed. Subsequently, it was examined whether descriptive norm manipulations were indeed successful. To do so, we analyzed whether the difference between perceptions of the descriptive norm and the norm as communicated was indeed smaller in the descriptive norm conditions, compared to the control condition. Therefore, scores were transformed to reflect the absolute deviation from the norm as communicated by the poster. As predicted, the mean deviation from the norm (i.e., difference between perception and norm as communicated) was lower in the healthy descriptive norm condition ( $M = 50.32$ ;  $SD = 40.78$ ), than in the control condition ( $M = 82.25$ ;  $SD = 42.85$ ),  $F(1,137) = 13.66$ ,  $p < .001$ ,  $\eta_p^2 = .09$ . The same procedure was followed for burger sales perceptions, and again the deviation from the norm was lower in the unhealthy descriptive norm condition ( $M = 42.97$ ;  $SD = 57.72$ ) than in the control condition ( $M = 90.25$ ;  $SD = 73.08$ ),  $F(1,134) = 11.76$ ,  $p < .005$ ,  $\eta_p^2 = .08$ .

Findings show that descriptive, but not injunctive, norm perceptions change as a result of norm messages. This is in line with previous research in our lab, as well as the differential qualities of injunctive vs. descriptive norms (see section "Discussion").

#### Intention to treat analyses

Before proceeding to the main analyses among those participants who reported being exposed to the social norms intervention, an intention to treat analysis for hamburger and salad choice was conducted on the full sample of 687 participants (7.6% missing cases;  $N_{total} = 635$ ). A hierarchical logistic regression was run to analyze the effects of the social norms messages on hamburger choices. In Step 1, we entered the variables pertaining to participants' gender,  $\beta(.23) = -.23$ ,  $p = .32$ ,  $OR = 0.79$  [ $CI = 0.51-1.25$ ] and their habitual behavior regarding the consumption of hamburgers for lunch,  $\beta(.23) = 2.61$ ,  $p < .001$ ,  $OR = 13.65$  [ $CI = 8.71-21.38$ ]. The social norm condition variable was entered

in Step 2,  $p = .74$ . Overall, the strongest predictor of hamburger choice was the habit to have a burger for lunch. The same analysis was done for decisions to have a salad for lunch. In Step 1 it was found that women were more likely to have a salad for lunch than men,  $\beta(.30) = 0.79$ ,  $p < .01$ ,  $OR = 2.20$  [ $CI = 1.22-3.94$ ] and that the habit to have a salad for lunch was a strong predictor of salad choice,  $\beta(.28) = 3.66$ ,  $p < .001$ ,  $OR = 38.93$  [ $CI = 22.40-67.66$ ]. In Step 2, the social norm condition variable was added, but it did not significantly predict food choice,  $p = .42$ . In sum, the intention to treat analyses revealed no significant effects of the norm manipulation on food choices.

#### Main analyses: intervention effects

The analyses of the intervention effects were conducted among the 231 participants who correctly identified to have been exposed to the norm message and those in the control condition (4.8% missing cases;  $N_{total} = 220$ ). To test the hypothesis that *hamburger consumption* would be highest in the unhealthy descriptive norm condition, a hierarchical logistic regression analysis was done in which the unhealthy descriptive norm condition was compared to the other three conditions on hamburger choice. Gender and habit were entered in the first step of the regression. The difference between men and women in the likelihood to eat hamburgers did not reach a level of significance,  $\beta(.39) = -.64$ ,  $p < .10$ ,  $OR = 0.53$  [ $CI = 0.25-1.12$ ], the habit to eat hamburgers was however found to be a strong predictor of hamburger choice,  $\beta(.39) = 2.62$ ,  $p < .001$ ,  $OR = 13.72$  [ $CI = 6.37-29.52$ ]. In the second step the social norm condition variable was added, but this was not a significant predictor of hamburger choice,  $p = .79$  (see Table 1 for comparisons between conditions).

To test the hypothesis that a healthy descriptive norm, as well as a healthy injunctive norm, would result in more *salad consumption* than an unhealthy descriptive norm, or no norm message (control group), another hierarchical logistic regression analysis was run, comparing these four groups on salad choice. Gender and habitual food choice were entered in the first step of the analysis. Gender was a significant predictor of food choice. That is women were more likely than men to choose a salad for lunch  $\beta(.56) = 1.61$ ,  $p < .005$ ,  $OR = 4.99$  [ $CI = 1.68-14.86$ ]. The habit to eat salads was also found to be predictive of whether people chose a salad for lunch,  $\beta(.50) = 3.79$ ,  $p < .001$ ,  $OR = 44.30$  [ $CI = 16.70-117.53$ ]. In the second step, experimental condition was added and was found to be a marginally significant predictor of salad choice,  $p = .06$  (see Table 2 for comparisons between conditions). The hypothesis that a healthy descriptive norm message would result in more salad consumption was supported: the odds to have a salad for lunch were higher in the healthy descriptive norm condition than in both the unhealthy descriptive norm condition ( $\beta(1.09) = 2.52$ ,  $p < .05$ ) and the control condition ( $\beta(.70) = 1.40$ ,  $p < .05$ ).

The hypothesis that the injunctive norm would result in more salad choices compared with the control condition was not

**Table 1**  
Odds ratios of unhealthy food choice.

	$B$ (SE)	OR [CI]
Control vs. UDN	-0.54 (.57)	0.58 [0.19–1.78]
HDN vs. UDN	-0.35 (.72)	0.71 [0.17–2.89]
IN vs. UDN	-0.58 (.68)	0.56 [0.15–2.11]
Control vs. HDN	-0.19 (.57)	0.83 [0.27–2.54]
HDN vs. IN	0.23 (.68)	1.26 [0.33–4.76]
Control vs. IN	0.04 (.52)	1.04 [0.38–2.87]

Note: All  $ps > .34$ . UDN = unhealthy descriptive norm, HDN = healthy descriptive norm, IN = injunctive norm.

**Table 2**  
Odds ratios of healthy food choice.

	<i>B</i> ( <i>SE</i> )	OR [ <i>CI</i> ]
Control vs. HDN	1.40 (.70) <sup>*</sup>	4.05 [1.02–16.06]
UDN vs. HDN	2.52 (1.09) <sup>*</sup>	12.40 [1.47–104.86]
Control vs. IN	1.03 (.70)	2.80 [0.71–11.05]
UDN vs. IN	2.15 (1.09) <sup>*</sup>	8.58 [1.02–72.00]
IN vs. HDN	0.37 (.78)	1.45 [0.31–6.65]
Control vs. UDN	−1.12 (.97)	0.33 [0.05–2.18]

Note: UDN = unhealthy descriptive norm, HDN = healthy descriptive norm, IN = injunctive norm.

<sup>\*</sup>  $p < .05$ .

confirmed. The odds to have a salad in the injunctive norm condition did not differ significantly from the odds to have a salad in the control condition ( $\beta(.70) = 1.03$ ,  $p = .14$ ). When comparing the injunctive norm condition to the unhealthy descriptive norm condition, a significant difference was found ( $\beta(1.09) = 2.15$ ,  $p < .05$ ), such that those in the injunctive norm condition chose a salad for lunch more often than those in the unhealthy descriptive norm condition.

## Discussion

The goal of the current study was to increase the external validity of the effects of descriptive and injunctive norms on food choice. For this purpose, a field experiment was conducted in which healthy and unhealthy descriptive norms, as well as healthy injunctive norms, were communicated. With regard to healthy social norms, it was hypothesized that both a descriptive (i.e., what most others do) as well as an injunctive norm (i.e., what most others think one should do) message would have a positive effect on food choice. In line with expectations, the healthy descriptive norm message resulted in more healthy choices compared with the no norm control condition. Those exposed to an injunctive norm message, however, did not make significantly more healthy food choices than those in the control condition. Both healthy social norms signs (i.e., descriptive, injunctive) did increase the number of healthy food choices relative to the unhealthy descriptive norm message. While findings with regard to healthy food choices mostly align with our predictions, unhealthy food choices remained unaffected by social norms messages.

The current study extends prior research on social norms and food choice by demonstrating that the influence of social norms goes beyond the laboratory environment (Burger et al., 2010) and affects food choices in real-life situations. This approach of studying norms in the field is in line with much of the social norms research, mainly in the domain of environmental concern (e.g., Cialdini, 2005; Cialdini et al., 1990; Nolan et al., 2008), and is important for demonstrating external validity. This study – high in ecological validity – confirms the assumption that social norms influence daily diet decisions. The current study also appears to support findings from laboratory-based studies focusing on the effects of social norms on food choices.

In fact the current findings with regard to effects of descriptive norms on healthy food choices mimic those from Burger et al. (2010). In a laboratory environment, they demonstrated differences between healthy and unhealthy descriptive norms on food choice, and between healthy descriptive norms and a control condition, but not between an unhealthy descriptive norm and a control group. Taken together, these findings seem to suggest that positive influences from the social environment with regard to food choices may be somewhat stronger than potential negative influences. A reason for this may be that upon confrontation with an unhealthy descriptive norm, e.g. seeing that most people con-

sume unhealthy foods, an injunctive norm, e.g. the realization that one should try to eat healthy, is activated. Another possibility may be that confrontation with unhealthy cues in one's social environment may trigger in some the goal to live healthily, which subsequently results in more healthy choices (Fishbach, Friedman, & Kruglanski, 2003; Papies, Stroebe, & Aarts, 2008). Investigating what makes people resist negative social influences with regard to food choices is vital, as it can provide a key in solving increasing problems with overweight and obesity.

Contrary to expectations, highlighting healthy injunctive norms (“you should eat salad”) did not result in healthier choices, compared to the control condition. This finding is not unique, as it aligns with findings from Lally et al. (2011). While they found that descriptive norm perceptions were predictive of fruit and vegetable, sugar-sweetened drinks and snack food intake, they found no effects of injunctive norms on food intake. They postulated that this may be due to the fact that injunctive norms may be less important for quick decisions. They also highlighted self-regulatory resources as a possible explanation. The same factors may underlie the current findings. While descriptive norms are most influential under conditions of low effortful cognitive activity, injunctive norms require more cognitive activity to influence behavior (Jacobson et al., 2011). The current setting of an on campus food court likely is one in which quick decisions are made under conditions of low effortful cognitive activity, which makes descriptive norms more likely to influence behavior, compared to injunctive norms.

Another reason may be that interventions that are based on telling people what they should or should not do cause reactance (Brehm, 1966). It may be that injunctive norm messages need to be coupled with factors that enhance credibility by, for example, attributing the message to an expert source (“Your doctor believes you should eat more fruits and vegetables”) or a source close to the target audience (Hogg & Reid, 2006; Terry & Hogg, 1996; “Your children would want you to eat more fruits and vegetables”). This approach may be somewhat more palatable than simply asserting: “you should eat more fruits and vegetables.” This is, of course, speculative, but it is worthy of future research to investigate the extent to which injunctive norms emanating from various sources are more or less effective.

Our findings indicate that highlighting healthy descriptive norms provides an effective strategy to promote healthy behavior. While this finding indicates that health campaigns can successfully promote healthy behaviors by making salient the preponderance of the behavior in a social environment, this strategy may not be possible if the preponderance of behavior is negative to begin with – if, for example, most people in the community practice unhealthy behaviors. In this case, it may be worth developing a strategic message frame that highlights the “special” nature of the few people who engage in the healthy behaviors. Indeed, the diffusion of innovations theory (Rogers, 1962) points out that innovators – who tend to be few in number – are often influential in propagating an innovation in society. Future research could investigate whether messages pertaining to prevalence of behavior are differentially influential, in comparison to messages pertaining to particular individuals.

## Limitations

A limitation of the current study is that only one-fifth of the participants actually reported having seen the posters through which social norms were conveyed. Exposure, of course, is key in attaining desired effects (McGuire, 1985), and it appears that a majority of respondents in the food court were not affected by our manipulations because they were not exposed to the messages. Additionally, there may be a gap between actual exposure and

reported exposure. Laboratory-based studies can ensure exposure because audiences tend to be captive, and thereby enhance the efficacy of the experimental manipulations. The strength of a field-experiment, however, lies in its ecological validity. However, the potency of field studies tends to be weaker because of lower levels of exposure to experimental stimuli in natural environments, thereby diluting effectiveness. This highlights the difference between efficacy and effectiveness (Flay, 1986).

Related to the previous point on message exposure, another limitation is that a large group of students in the experimental conditions were removed from analyses because they reported not seeing a sign upon entering the food-court. In the control condition only a small number of participants were removed from analyses (for the opposite reason of indicating to have seen a poster upon entering). This means that the composition of participants in the social norm conditions might be more homogeneous than in the control group. An alternative explanation might therefore be that this difference between the experimental conditions and the control condition is responsible for the differences found in food choice. This, however, seems unlikely, as the largest differences were found between the healthy and unhealthy social norm conditions. This makes it more likely that the social norm messages are indeed responsible for changes in food choice and that these findings are not merely an artifact of participant selection.

With regard to norm perceptions it was found that descriptive norm perceptions changed as a function of descriptive norm messages, while injunctive norm perceptions did not. An explanation for this finding might lie in the differential qualities of injunctive and descriptive norms. While descriptive norms are likely to change from situation to situation, injunctive norms are relatively universal cultural standards on how to behave (Reno, Cialdini, & Kallgren, 1993). Consequently, most people are already aware of what others approve or disapprove of. While descriptive norm messages changed norm perceptions and thereby changed behavior, injunctive norm messages likely affect behavior by making salient already existing beliefs (Fishbein & Cappella, 2006). Future research, however, should explore enhanced methods to measure whether injunctive norms are successfully activated by means of messages.

A final consideration is that the researcher was not blind to the conditions of the study. Every day the signs that conveyed the normative messages were set up by the researcher who also handed out the questionnaires; this might have influenced the results. To this end, researchers – apart from certain constraints mentioned in the methods section – tried to distribute the questionnaires in a way that was as random as possible. Objective sales-data obtained from the food-court<sup>2</sup> indeed provide evidence that this random selection of participants was successful. Objective sales-data were mostly in line with self-reported food choice data obtained through the questionnaires, meaning that relative differences between conditions are comparable for objective and self-reported choices.

This enhances our confidence that the behavior data obtained through the questionnaires indeed reflects actual choices made by visitors of the food court and were likely not the result of the researcher's bias.

## Conclusion

Findings from this study point to the fact that the social environment plays a great role in food choices people make on a daily basis. More research, however, is needed to uncover the conditions under which descriptive or injunctive norms most strongly influence behavior. Additionally, the factors that determine whether or not people conform to social norms deserve more attention, as it will deepen our understanding of normative influence, as well as aid the development of more effective health campaigns.

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<sup>2</sup> Objective data concern the number of transactions of the salad bar and grill area the first day each sign was displayed. This was done because these data points resemble the self-reported data the most, because a single transaction reflects a single person in this case. Numbers salad choice: Injunctive #332; Healthy descriptive #357; Unhealthy descriptive #283; Control #273. Numbers burger choice: Injunctive #225; Healthy descriptive #177; Unhealthy descriptive #188; Control #148.

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