

# The effect of social norms on adult men; does it differ between high and low Socio-Economic Status?

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Master Thesis

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## **Abstract**

Obesity is found to be more prevalent among low SES populations. Differences in attitudes and environment between high and low SES have been studied. Differences in social norm effects, which have been proven to influence behavior, have not. A finding that Low SES individuals tend to rely more on external factors as drivers for behavior hints at a possibility that social norms could be more effective on low SES individuals. Therefore, this study aimed to investigate whether social norms produce a larger effect on low SES individuals than on high SES individuals. Additionally, it took into account several moderators and a secondary effect. High and low SES men were recruited and both divided into experimental and control conditions. The experimental conditions received a descriptive normative message promoting water consumption. No social norm effect was found. As a result, the moderators and secondary effect were also unable to be determined. Not finding an effect was mainly attributed to low sample sizes, especially in the low SES conditions. However, among other implications, being too innovative was discussed as being an issue.

**Keywords:** social norms, descriptive norms, Socio-Economic Status; spillover effect; obesogenic behavior

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## Introduction

Living a healthy life, is that not what we all strive for? Sadly, it does not come equally as easy to everyone. This is illustrated by an increase in prevalence of obesity from 6,4% to 12,0% among the global population between 1980 and 2008 (Stevens et al., 2012). Especially in North America, Southern Latin America and North Africa, which all surpassed Central and Western Europe for the top spot, obesity prevalence is growing rapidly (Stevens et al., 2012). However, when zoomed in on the phenomenon, it appears that obesity is more common among people of a relative lower socio-economic status (SES) (Drewnowski, 2009). This can be attributed to several factors of which some have been thoroughly researched and others still need identification.

An initial explanation for the higher prevalence of obesity among low SES individuals was their attitudes, beliefs and knowledge about nutrition and health. Research found low SES individuals to have less favorable attitudes towards healthy eating and poorer knowledge about health consequences than high SES individuals (Hearthy et al., 2007; Parmenter, Waller & Wardle, 2000; Wardle & Steptoe, 2003). These factors provided part of the explanation for why low SES individuals were less likely to engage in health promoting behaviors such as exercising and refraining from smoking or eating healthy (Lantz et al., 1998; Stringhini et al., 2010; Wardle & Steptoe, 2003). However, as Kraus (1995) had already stated, even though attitudes are substantial contributors to behavior, the largest part of behavior is still able to be explained by other factors like stress or the environment (Lee et al., 2010; Torres & Nowson, 2007). It was therefore warranted to look for alternative explanations for low SES individuals' obesogenic behavior.

As mentioned, a next explanation that was investigated was the physical environment. It was found that the physical environment of low SES communities was characterized with less healthy food outlets and more opportunities for the purchase of unhealthy foods (Lee et al., 2010). Concurrently, the diets of the inhabitants of these environments were found to be less healthy (Brug, 2008). These findings complemented each other nicely and indeed seemed causal. It was even strengthened by the fact that improvements made to the availability of healthy foods in these neighborhoods resulted in healthier diets among the residents (Gittelsohn, Rowan & Gadhoke, 2012). However, other research found that high and low SES neighborhoods did not differ significantly in terms of availability of healthy and unhealthy foods (Ball, Timperio & Crawford, 2009; Leonard et al., 2014). Moreover, Leonard et al. (2014) found that the differences of available healthy and unhealthy foods are actually a result of the behavior of the residents as a demand for unhealthy food attracts unhealthy food outlets (Leonard et al., 2014). As low SES individuals are more prone to unhealthy dietary behavior (Lantz et al., 1998; Oyserman, Fryberg & Yoder, 2007; Stringhini et al., 2010), Leonard's theory makes it plausible that their behavior created the subtle differences in the food environment rather than vice versa.

Currently, the extent to which social norms influence obesogenic behavior, is being investigated. Many people look at their peers, like friends or neighbors, for guidance in what to eat (Ball et al., 2010; Leonard et al., 2014; Mollen et al., 2009; Prinsen, De Ridder & De Vet, 2013; Robinson et al., 2014; Stok et al., 2014). Hence, the information about peers' food intake serves as a guideline for own behavior. This information can be conveyed through a message or through observation of the actual behavior. Directly copying behavior of others is referred to as social modelling (Cruwys, Bevelander & Hermans, 2015). Social modelling is a type of social norm as outcomes of social modeling research and its proposed working mechanism are similar to that of research on social norm messages (Cruwys, Bevelander & Hermans, 2015).

Social norms have already been found to be able to influence behaviors like recycling, water use restriction, physical activity and the consumption of alcohol, fruit and vegetables among other foods (Ball et al., 2010; Emmons et al., 2007; Jaeger & Schultz, 2017; Larimer et al., 2004; Robinson, Fleming & Higgs, 2014; Schultz, 2007; Stok et al., 2014). However, most research on social norms' effects on dietary behavior has been conducted among either students, women or, most commonly, a combination of the two (Cruwys, Bevelander & Hermans, 2015; Stok et al., 2012; Stok et al., 2014). This creates a gap in knowledge. Low SES individuals their response to social norms has not been identified yet, which is unfortunate for two reasons. The first reason is that low SES individuals are the ones who would probably benefit most if health promoting social norm messages produce the desired effect (Robinson, Fleming & Higgs, 2014). The second reason is that if social norms are more effective in low SES individuals it is quite possible that unhealthy behavior of peers causes own unhealthy behavior, which explains their tendency to relatively engage more in unhealthy behaviors than high SES individuals do. In other words, it would identify a root of the problem as well as an opportunity for improvement.

This research will expand on the existing literature in several areas. As women were predominantly used as research populations, this research will examine the effects of social norms among men only. Additionally, these previously used research populations were all adolescents or students. This research will aim to recruit a population of adult men. Finally, given that obesity is more common among people with a relatively lower socio-economic status (SES) (Drewnowski, 2009), it hints at a possibility that social norms affect low SES individuals, perhaps even more than they do high SES individuals. Therefore, this research will test the hypothesis whether the effects of social norms are stronger in men with a relatively lower SES compared to men with a relatively higher SES.

## **Theoretical Framework**

### Norms in theory

As stated in the introduction, information about other people's diet influences your own diet (Ball et al., 2010; Leonard et al., 2014; Mollen et al., 2009; Prinsen, De Ridder & De Vet, 2013; Robinson et al., 2014; Stok et al., 2014). This principle has been used in several theories. One of the most commonly used theories is the Theory of Planned Behavior, depicted in Figure 1 (Ajzen, 1985). In his theory, Ajzen states that behavior is always preceded by an intention to perform said behavior. This intention, in turn, is induced by three distinct constructs. The first of these constructs is attitude. An attitude is the way a person feels about a certain object, person or behavior. This can be either positive, which will promote intention, or negative, which will reduce intention. These attitudes develop throughout a person's life. The second construct is perceived behavioral control. As the construct indicates by its name, it is the ability a person thinks he or she has to perform a certain behavior. In other words, it could also be defined as the amount of effort the person estimates he or she needs to alter the situation. The final construct is subjective norm. The subjective norm was described as "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1985). This construct thus indicates that peers have an influence on a person's intentions and consequently behavior.

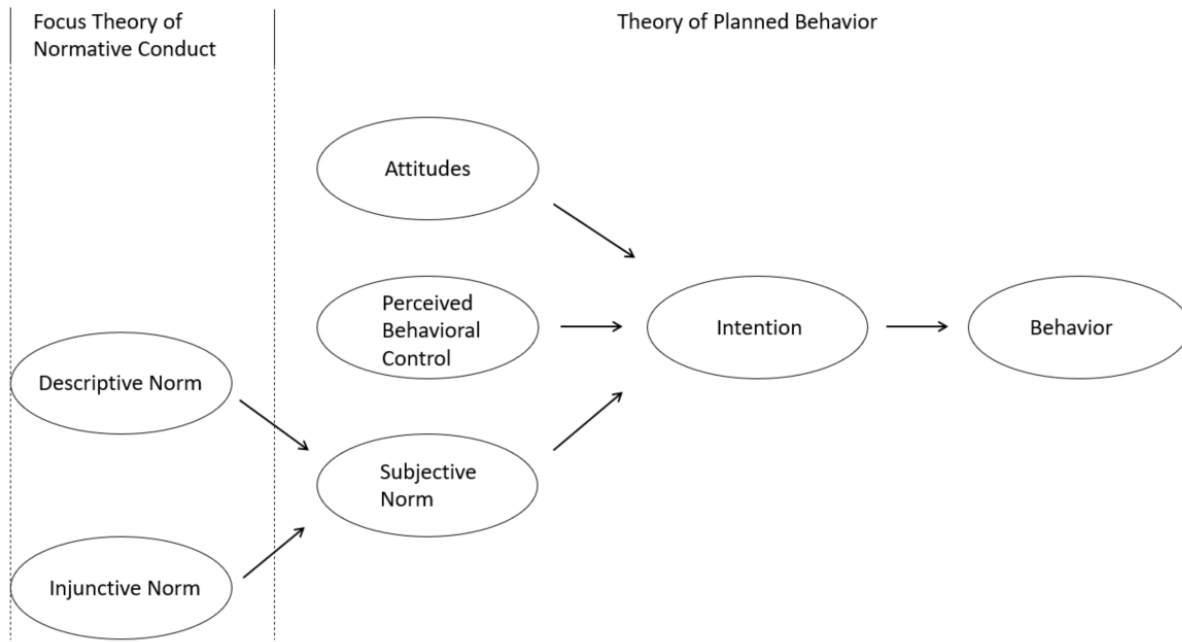


Figure 1. Link between Theory of Planned Behavior and Focus Theory of Normative Conduct.

Cialdini, Reno & Kallgren (1990) elaborated on the concept of subjective norms in the Focus Theory of Normative conduct (Figure 1). They divided the subjective norm into two types of social norms that proposedly trigger different goals (Cialdini, Reno & Kallgren, 1990). The first norm is called the descriptive norm. A descriptive norm merely describes what other people do. This norm triggers the goal for finding behavior that is beneficial for survival. If others perform a certain behavior after which they live happily or healthily, that behavior is probably beneficial for the observer as well. The opposite also holds true; if you see someone get ill after eating a certain mushroom, you are not eager to eat that same type of mushroom. The other kind of social norm is called the injunctive norm. This norm provides information about the approval, or disapproval, of others towards a certain behavior. This norm triggers the goal for social affiliation. Adhering to this kind of norm assures acceptance by peers through performing desired behavior. As these norms make up the subjective norm together, they thus influence intention and consequently behavior. Both norms will be discussed in more detail below.

### Descriptive norm

As stated above, the descriptive norm provides information about the behavior that other people perform. This could be, for example, all of your coworkers eating a piece of fruit at 4 pm. When a discrepancy between own behavior and that of others is made salient, it will spark motivation for change (Schultz, 1999). To stick with the example, when you customarily do not eat a piece of fruit at 4 pm while everyone around you does, you will feel the need to conform to this norm and thus also eat a piece of fruit at 4 pm. The information of others' behavior will be readily available, usually unconsciously, when a decision has to be made about food purchase and/or consumption (Mollen et al., 2013; Robinson et al., 2014; Stok et al., 2014). It can then be used as a heuristic for decision making as it indicates what behavior is correct and beneficial to perform (Mollen et al., 2013; Robinson et al., 2014; Stok et al., 2012; Stok et al., 2014). This heuristic will even be in effect in situations where low cognitive activity is used to make a decision (Mollen et al., 2013). It can thus influence behavior, either promoting healthy food choices, like the piece of fruit or unhealthy ones, like a sugary snack. Moreover, as normative information is usually processed unconsciously, it sparks intrinsic motivation

for certain behavior (Jaeger & Schultz, 2017). Behavior arising from intrinsic motivation is found to be more pervasive and persistent (Deci & Ryan, 1975) which explains that descriptive norms not only have an immediate effect, which is usually studied, but its effect is also found at a follow up after three days (Stok et al., 2014). This research, however, will investigate whether effects of social norms can last even longer.

Information about other people's consumption, however, is dependent on subjective perception (Lally, Bartle & Wardle, 2011). Unfortunately, it is common to perceive others as less health conscious than they actually are. Hence, people tend to overestimate the extent to which others perform adverse health behaviors (Lally, Bartle & Wardle, 2011; Perkins, Perkins & Craig, 2010; Schultz et al., 2007). This misperceived norm can then negatively affect own health behavior, like reducing fruit and vegetables consumption or increasing sugar-sweetened beverages consumption (Lally, Bartle & Wardle, 2011; Perkins, Perkins & Craig, 2010). Correctly informing people about their peers' actual health behavior is therefore speculated to be an adequate strategy for improving people's own health behavior. This research will aim to confirm whether people perceive their peers to be less healthy. This provides the opportunity to identify whether low SES people perceive their peers to be even healthier, which could be caused by aforementioned misperceptions.

### Injunctive norm

Next to the information about other people's actual behavior, people might be influenced by what their peers approve or disapprove of eating (Perkins, Perkins & Craig, 2010; Stok et al., 2014). This constitutes the injunctive social norm. It relates to the subjective norm of the Theory of Planned Behavior which was described as "the perceived social pressure to perform or not to perform the behavior". Especially the word pressure is fitting as injunctive norms tell people what other people think they should do. Conforming to this norm serves the need for affiliation (Mollen et al., 2013) as it is linked to maintaining group identity (Larimer et al., 2004).

The finding that an injunctive norm, by itself, does not affect behavior is most prominent (Lally, Bartle & Wardle, 2011; Mollen et al., 2013; Robinson Fleming & Higgs, 2014; Stok et al., 2014), even though it has been found to be able to affect intention positively towards health promoting behavior in adults (Staunton et al., 2014; Yun & Silk, 2011) and negatively towards eating healthy in adolescents (Stok et al., 2014). Yet, injunctive norms remain an important part of social norm research, mainly due to its potential moderation of descriptive norm effects. One of these moderating effects found by Shultz (2007) is that adding an injunctive norm to a descriptive norm message can increase the duration of its effect and reduce boomerang effects, which will be discussed later.

Injunctive norm effects are, however, highly dependent on several factors such as a personal tendency to maintain group identity (Larimer et al., 2004), self-identity congruence with the targeted behavior (Yun & Silk, 2011), self-regulation capacity (Jacobsen, Mortensen & Cialdini, 2011) and the forcefulness of the presented normative message (Stok et al., 2014). Considering these factors, the use of an injunctive norm is much more delicate and harder to control for than that of a descriptive norm. Therefore, injunctive norms will not be used in this study.



### Boomerang effect and spillover effect

Caution is warranted when providing normative information as it may have unwanted, so called, boomerang effects (Schultz, 2007). The boomerang effect poses that people who perform below a presented norm for a certain health behavior will consequently increase the presented behavior. For instance, when presented with the fact that peers drink five glasses of water every day, people who only drink two will increase their water consumption. In contrast, people who performed above the norm prior to the norm presentation might decrease their behavior. Thus, presentation of the fact that peers drink five glasses of water every day while people drink eight already could lead them to reduce their water consumption. Consequently, one normative message could simultaneously increase and decrease health behavior within parts of the population. This phenomenon has been confused for statistical regression to the mean, which states that individuals who score (extremely) high or low on an initial measurement will be likely to score closer to the mean on a following measurement (Verkooijen, Stok & Mollen, 2015). To account for this, the use of a control group is of importance. If no control group is included in social norm research, found effects could be due to other factors like regression to the mean.

As discussed, social norms can have an impact on behavior. In some situations the impact reaches even further than just its main effect. Social norms can have a so called spillover effect (Stok et al., 2016). In their review, Stok et al. (2016) found that increasing healthy food intake through normative messaging can decrease the intake of unhealthy foods. This effect seems to be unilateral as decreasing unhealthy food consumption was not found to simultaneously increase healthy food consumption. Experiments researching the spillover effect, however, are still low in number. This study will therefore add an investigation into a potential spillover effect.

### Social Norms and Identification

When a descriptive normative message is presented it tells the receiver about what another group of people is doing. This other group of people is called the referent group. The effects of how much one identifies him- or herself with the referent group are still under debate. Neighbors et al. (2008) found that the effect of written descriptive norms were unaffected by the closeness of the referent group. Stok et al. (2012) confirmed this in a later study. However, in a review, also by Stok et al. (2016), six studies were identified in which stronger identification with the referent group was linked to stronger effects of written descriptive norms. These studies did, however, target adolescents, so whether these effects are similar in adults remains to be confirmed. As for visual descriptive norms, the review by Cruwys et al. (2015) stated that similarity between the person providing the norm and the person receiving the norm is of importance. The more similar the two are, the stronger the effect of the social norm (Cruwys et al., 2015).

The link between identity and behavior has also been addressed through the finding that conforming to eating behavior reinforces and validates identity (Robinson et al., 2014; Stok et al., 2012). This is in line with the theory of identity based motivation (Oyserman, Fryberg & Yoder, 2007). This theory states that behavior is often performed because it is identity-congruent. Unfortunately for low SES populations, high SES populations have usually claimed most healthy characteristics as part of their identity (Oyserman, Fryberg & Yoder, 2007). As a result, low SES groups are stuck with a less healthy identity to conform to, making health consequences less important drivers for their behavior.

Currently, few studies included self-identity as a factor in social norm research. Yun & Silk (2011) found that self-identity was able to moderate descriptive norm effects. They found that having a strong self-identity related to promoted behavior reduced social norm effectiveness and having a weak self-identity related to promoted behavior increased social norm effectiveness. To account for this potential moderator and to be able to offset peer identity, self-identity will be included in the measurements of this study.

### Social Norms and Socio-Economic Status

A vast amount of research has looked into aspects, effects or consequences of Socio-Economic Status. As a result, many definitions have been developed and many measures have been used to assess it. Most definitions come down to it being a person's social position based on education, occupation and income (White, 1982).

One of the aspects research has looked into is of particular interest for this study. It concerns cognitive differences between high and low SES individuals. Kraus et al. (2012) found that low SES individuals have more contextualist tendencies. This means that they put more focus on external cues and that external forces have more influence on their behavior than they do on high SES individuals. In contrast, high SES individuals have more solipsistic tendencies. This means that they rely more on their own mind as an information source that validates and drives their behavior (Kraus et al., 2012).

From this information we can speculate that social norms will have more influence on low SES individuals than they will on high SES individuals. However, no social norm research has been conducted showing a difference in sensitivity between high and low SES individuals. Robinson et al. (2014) advocated that social norm research should be done among men and across SES. This research aims to fill this gap in knowledge by investigating whether men with a low SES are more susceptible to social norm effects than are men with a high SES.

## Research question

The main focus of this research is the effect of social norms on adult men with a high SES and men with a low SES. This focus is new in the field of social norm research. As it is presumed that people with a low SES are more likely to be influenced by external factors, the hypothesis is that normative messages will have a larger effect on men with a relatively lower SES.

Social norm effects have been found to last up to three days. This research aims to investigate whether the duration of social norm effects extends even further. Measurement will take place one week after presentation of the norm to assess whether a one-time social norm message is capable of producing an effect that is still detectable after seven days.

Most previous research on social norms has been done among either women or students. This research will explore the effects of descriptive norms on adult men. In this study, both a written and visual descriptive norm will be presented to the participants in the experimental condition. As the visual norm is expected to be dependent on how much the participants identify with the man in the picture, the rate of identification is measured. Higher identification rates are presumed to be accompanied by a larger social norm effect.

Additionally, the self-identity and peer identity will be measured to assess their influences on social norm effects. This is relevant as having a strong self-identity as being a healthy person can reduce the effect of a social norm promoting healthy eating. Peer identity is related to the present social norm. If peer identity for healthy eating is already high, it is likely to reduce the effect of a social norm promoting healthy eating.

Lastly, it will be investigated whether a provided descriptive norm will generate spillover effects. As spillover effects have only been found when healthy food was promoted. This research will also promote healthy food intake but with a food that has not yet been used before.

Main question:

- Do social norms have a larger effect on low SES men compared to high SES men?

Sub questions:

- Does a one-time descriptive norm produce an effect that lasts a week?
- Does identification with the visual norm have a moderating effect on descriptive norm effects?
- Does self-identity have a moderating effect on descriptive norm effects?
- Does peer identity have a moderating effect on descriptive norm effects?
- Is the social norm effect accompanied by a spillover effect?

## Methods

### Participants

Dutch speaking participants were recruited in two different settings. The first setting was the university and its research center where participants were directly approached and asked to participate in this study. To reach the set quota, an e-mail through the chair group offices was used to find and recruit additional male academic staff. The second setting consisted of canteens of garbage collection companies. In and around these canteens, flyers were posted inviting people to sign up for this study. As this yielded very few participants, the canteens were then visited either during lunch or prior to the start of the workday. During these visits potential participants were approached directly and asked to participate in the study. The academic staff was assumed to have a high SES and garbage collection employees to have a low SES. The aim was to recruit at least 60 men from both settings. Both groups would then be split in two in order to create a control condition and an experimental condition for both high and low SES.

To check whether 60 participants is enough, a sample size calculation was performed (Figure 2). The assumptions were that the standard deviation would be one and that 70% of the participants in the experimental condition would be influenced by the normative message. The  $Z_{\alpha}$  is one-tailed on a 95% confidence interval, giving it the value of 1,65. The  $Z_{1-\beta}$  uses a power of 80%, giving it the value 1,84.

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^2 \sigma^2}{\Delta^2}$$

Figure 2. Sample Size Calculation Formula.

When filled in the calculation is as follows:

$$(2 \times (1,65 + 0,8416)^2 \times 1^2) / 0,7^2 = 25.34$$

The outcome stated that the study should have a minimum of 26 participants in each of the four groups. That means with the abovementioned assumptions, even with a 10% drop out, 60 participants per setting, or 30 per condition, should be enough to yield meaningful results.

Initially, 115 participants were recruited for this study. 44 out of these 115 were admitted into the low SES category and the other 71 into the high SES category. Completion rate among low SES participants was 23 out of 44 (52,3%) and among high SES this was 49 out of 71 (69,0%). In the end, due to an overall response rate of 62.6%, a total sample of 72 participants remained.

### Design

This research used a 2 (high versus low SES) x 2 (control versus experimental condition) x 2 (time) factorial design. High and low SES participants were both randomly assigned to either the control or experimental condition. The measurements occurred at two moments in time. The measurement in the first week could be seen as a baseline measurement whereas the second measurement was aimed to assess whether there was an effect after experimental manipulation.

## Procedure

In order to enroll in this study participants had to provide their e-mail addresses. This e-mail address was used to send a total of three e-mails to the participants over a time period of three weeks.

The first e-mail was sent on Thursday in the first week (T1). In the mail they were welcomed and received a link to a questionnaire about their food intake of the previous three days followed by control questions aimed to validate SES.

The second e-mail was sent on Thursday in the second week. This e-mail contained another link to a questionnaire with filler questions asking participants about factors surrounding their dietary pattern. For the experimental group this questionnaire was preceded by a fictional message that the results of the first week showed that participants of this study drank a remarkably high amount of water. This notice was accompanied by a picture of a man drinking water. The control group did not receive this message. At the end of this second questionnaire the participants were asked to rate their self-identity and peer identity as healthy eaters.

The third e-mail was sent on Thursday in the third week (T2). This e-mail contained a link to the same questionnaire about their food intake of the previous three days as was sent in the first week. The control questions aimed at validating the SES were replaced by the picture of the man drinking water, that was previously only seen by the experimental groups, and a question asking the participants to what extent they identified themselves with this man.

After completion of the experiment, the participants were debriefed as instructed by the ethical committee and prizes for participation were awarded to random participants who completed all three questionnaires of the experiment. After the prizes were awarded, the e-mail addresses were deleted from record.

## Measures

Participants received a normative message promoting water consumption. As stated, a potential spillover effect was also of interest. The assumption was that if a spillover effect would occur it would affect either sugar-sweetened beverage or coffee consumption. Therefore, water, sugar-sweetened beverage and coffee consumption were measured using items adopted from the Dietary History Questionnaire (National Cancer Institute, 2018). This questionnaire assesses both frequency and quantity.

### **Food consumption items**

Water, sugar-sweetened beverage and coffee consumption were all assessed using two items. The first item assessed how many of the previous three days the participants consumed the beverage in question. The second item presented the participants with five options with which they could indicate the quantity they consumed the beverage per day on average (Figure 3). The frequency multiplied by the average amount added up to the total amount of water, sugar-sweetened beverages or coffee that was consumed over three days.

Hoeveel porties (1 portie = 1 glas) water dronk u gemiddeld per dag?

- 7+
- 5 of 6
- 3 of 4
- 1 of 2
- Minder dan 1

Figure 3. Question about the quantity of water consumption per day.

The DHQ originally uses a weekly range. Frequencies used in this study had been altered to a three-day range. Additionally, as the DHQ is a rather long questionnaire aimed at assessing a complete dietary overview, only a selection of items was used. The questionnaire had purposely been kept short to reduce the time needed to complete it. Instead of an hour, the adapted questionnaire used in this research took about five minutes to complete. The assumption, however, is that the questionnaire was still inclusive enough to mask which items are of particular interest in this study.

### Demographics and Socio-Economic Status

The control questions assessed age, height in centimeters and weight in kilograms. This allowed for BMI calculations and the possibility to control for it if necessary. Moreover, an item assessing education level was added to validate SES. The participants had a list of education levels from which they could indicate the highest they had completed. These education levels ranged from the lowest high school level to a university degree. It also included the “other” option through which participants could indicate whether they had completed an education that was not on the list or had not completed any of the presented educations. Since SES was defined as someone’s social position based on education, occupation and income, measuring education alone should prove to be sufficient as the participants were recruited through their occupation, which in turn also gives a rough estimation of their income levels.

### Self-identity, peer identity and identification

The second questionnaire was full of filler questions surrounding dietary patterns. These questions included who does the groceries in the household and who cooks on a regular basis. At the end of the second questionnaire several questions were aimed at self-identity and peer identity. These items measured whether the participants identified themselves and their close social connections (peers) as healthy eaters. Self-identity, as well as peer identity, was measured on a self-developed five-point scale ranging from -2 (very unhealthy) to 2 (very healthy).

The third questionnaire contained the exact same items for food consumption as the first questionnaire. After these items, participants in the experimental conditions were asked whether they remembered the social norm message. This question was used to detect whether the manipulation had been too obvious. The final item of this last questionnaire assessed to what extent the participants identified themselves with the man in the picture on a scale from 0 to 100. The outcome of this item could consequently be expressed in percentages of perceived similarity.

## Data Analysis

A repeated measures analysis of variance (ANOVA) was used to analyze the water, sugar-sweetened beverage and coffee consumption data. The outcomes indicated whether the changes in the measures between T1 and T2 within conditions varied significantly between conditions.

For the analysis of difference in self-identity and peer identity, a regular ANOVA was used. The difference between self-identity and peer identity within conditions was analyzed by means of another repeated measures ANOVA. Here self-identity was used as the starting variable and peer identity as the follow up variable.

## Results

### Demographics

Out of the 23 participants in the low SES category, 12 were in the control condition ( $M_{age} = 43.9$ ,  $SD_{age} = 12.7$ ;  $M_{BMI} = 25.5$ ,  $SD_{BMI} = 2.3$ ) and 11 were in the experimental condition ( $M_{age} = 44.4$ ,  $SD_{age} = 11.5$ ;  $M_{BMI} = 28.0$ ,  $SD_{BMI} = 3.3$ ). 24 of the 49 participants in the high SES category were in the control condition ( $M_{age} = 51.8$ ,  $SD_{age} = 11.9$ ;  $M_{BMI} = 25.0$ ,  $SD_{BMI} = 3.4$ ) and 25 were in the experimental condition ( $M_{age} = 50.5$ ,  $SD_{age} = 10.7$ ;  $M_{BMI} = 23.7$ ,  $SD_{BMI} = 2.1$ ) (Table 1).

Even though a large difference in age was found between the high SES control group and the low SES control group with a gap of 7.9 years between the means, the four conditions did not differ significantly in terms of age  $F(3, 68) = 1.92$ ,  $p = 0.135$ . BMI, however, was found to differ significantly between the conditions  $F(3, 66) = 5.82$ ,  $p = 0.001$ . Tukey's HSD showed that the low SES experimental group had a significantly higher BMI than both high SES control and experimental conditions  $p = 0.032$  and  $p = 0.001$  respectively.

As for the obviousness of the normative message, 10 out of 36 participants in the experimental conditions correctly remembered the normative message of the second week in the third week. 20 out of 36 indicated that they did not remember and 6 gave a wrong answer.



## Water consumption

Water consumption was measured at baseline (T1) and after three weeks (T2), in which only the experimental conditions received the social norm message. As can be seen in Table 1, all groups' water consumption increased from T1 to T2. The high SES control group increased their water consumption from 10.2 (4.6) glasses in three days to 11.5 (4.9) glasses, the high SES experimental group increased their water consumption from 9.8 (6.9) to 11.5 (5.4), the low SES control group increased their water consumption from 10.3 (6.7) to 13.0 (7.6) and finally, the low SES experimental group increased their water consumption from 9.7 (7.3) to 13.4 (6.1) glasses in three days.

Table 1. Main effect, identity and spillover effect measurements for all four conditions.

	High SES (N = 49)				Low SES (N = 23)			
	Control (N = 24)		Experiment (N = 25)		Control (N = 12)		Experiment (N = 11)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Water Consumption (in 3 days) T1	10.19	4.58	9.78	6.88	10.29	6.66	9.68	7.33
Water Consumption (in 3 days) T2	11.54	4.93	11.52	5.40	13.00	7.63	13.36	6.05
<b>Identity</b>								
Identification	61.48	21.19	46.04	22.48	61.75	18.86	54.64	23.25
Self-identity	0.92	0.78	1.00	0.29	0.75	0.75	0.64	0.67
Peer identity	0.83	0.48	0.60	0.65	0.33	0.65	0.27	0.65
<b>Spillover Effect</b>								
SSB Consumption (in 3 days) T1	0.46	1.29	0.74	1.44	2.46	3.34	2.18	3.10
SSB Consumption (in 3 days) T2	0.42	0.91	0.82	1.36	3.25	4.70	2.18	3.24
Coffee Consumption (in 3 days) T1	12.88	4.03	10.04	7.02	11.00	6.53	11.05	3.24
Coffee Consumption (in 3 days) T2	12.63	3.88	10.26	6.03	10.00	5.29	11.59	4.51

Overall, water consumption increased significantly from T1 to T2,  $F(1, 68) = 17.67$ ,  $p < 0.001$ . However, no increase in water consumption within one condition differed significantly from the increase in water consumption of any other condition,  $F(3, 68) = 0.813$ ,  $p = 0.49$ . What is more, Levene's test for equality of error variance indicated that the error variance of the dependent variable was not equal across groups for water consumption on T1,  $F(3, 68) = 3.352$ ,  $p = 0.024$ .

## Identification

Identification with the man in the picture was measured on a scale from 0 to 100 to resemble percentages of perceived similarity. The high SES control conditions indicated their perceived similarity at 61.48% (21.19). For the high SES experimental condition this was 46.04% (22.48). For the low SES control condition it was 61.75% (18.86). And lastly, the low SES experimental condition indicated the perceived similarity at 54.64% (23.25). No significant difference was found between conditions' identification to the man in the picture,  $F(3, 68) = 2.454$ ,  $p = 0.07$ .

## Self-identity and peer identity

All conditions indicated that they perceived themselves as having a somewhat healthy self-identity as can be seen in Table 1. The high SES control condition scored this at 0.92 (0.78), the high SES experimental condition scored it at 1.00 (0.29). The low SES control condition scored slightly lower in terms of having a healthy self-identity at 0.75 (0.75) as well as the low SES experimental condition who scored it at 0.64 (0.67).

Between the groups no significant difference was found in having a healthy eating self-identity,  $F(3, 68) = 1.061$ ,  $p = 0.372$ . Even when the high SES groups were pooled and its mean self-identity was compared to that of the low SES groups combined, no significant difference was found,  $F(1, 70) = 2.841$ ,  $p = 0.096$ .

The perceived peer identity as being healthy eaters was lower in all groups than the perceived self-identity as being a healthy eater. The high SES control condition scored peers' healthy eating identity at 0.83 (0.48) and the high SES experimental condition scored this at 0.60 (0.65). The low SES conditions, again, scored these measures somewhat lower. The low SES control condition scored it at 0.33 (0.65) and the low SES experimental condition scored this at 0.27 (0.65).

The perception of peers' healthy eating identity differed significantly between the four conditions,  $F(3, 68) = 3.110$ ,  $p = 0.032$ . The largest difference was found between the high SES control condition and the low SES experimental condition. When the high SES and the low SES conditions were both pooled it showed that low SES participants perceived peers to be less healthy eaters than high SES participants did,  $F(1, 70) = 7.404$ ,  $p = 0.008$ .

Overall, participants perceived their self-identity as significantly healthier than the identity of peers,  $F(1, 68) = 14.483$ ,  $p < 0.001$ . The high SES experimental condition was the only condition that viewed others as significantly less healthy than themselves,  $F(1, 49) = 9.600$ ,  $p = 0.003$ . No discrepancy between self- and peer identity within any one condition, however, differed significantly from that of any other condition,  $F(3, 68) = 1.222$ ,  $p = 0.308$ . Also, the high SES participants pooled showed no significant difference in discrepancy between self- and peer identity perception compared to the low SES participants combined,  $F(1, 70) = 0.769$ ,  $p = 0.384$ .

### Spillover effect

Changes in sugar-sweetened beverage consumption were not unilateral as conditions either increased, decreased or maintained their sugar-sweetened beverage consumption from T1 to T2. All of these changes, however, were marginal. Firstly, the high SES control condition decreased sugar-sweetened beverage consumption from 0.46 (1.29) to 0.42 (0.91). Secondly, the high SES experimental condition increased sugar-sweetened beverage consumption from 0.74 (1.44) to 0.82 (1.36). Thirdly, the low SES control condition also increased sugar-sweetened beverage consumption from 2.46 (3.34) to 3.25 (4.70). And Finally, the low SES experimental condition averaged 2.18 glasses of sugar-sweetened beverages in three days at both measurement moments.

The sugar-sweetened beverage consumption for all conditions showed no significant change,  $F(1, 68) = 0.504$ ,  $p = 0.480$ . Additionally, the change in sugar-sweetened beverage consumption over time within conditions did not differ significantly across the conditions,  $F(3, 68) = 0.386$ ,  $p = 0.763$ .

A significant difference was found, however, in sugar-sweetened beverage consumption at T1,  $F(3, 68) = 3.546$ ,  $p = 0.019$ . More specifically, the low SES control condition consumed significantly more sugar-sweetened beverages than the high SES control condition,  $p = 0.046$ . When further examined, it was found that the low SES participants combined consumed significantly more sugar-sweetened beverages than the high SES participants combined,  $F(1, 70) = 10.581$ ,  $p = 0.002$ . Similar to the tests for water consumption, homogeneity of variances was not attained in both these analyses  $p < 0.001$  and  $p = 0.002$  respectively.

As with the sugar-sweetened beverage consumption, coffee consumption of different conditions was found to either increase or decrease marginally from T1 to T2. Firstly, the high SES control condition decreased coffee consumption from 12.88 (4.03) to 12.63 (3.88) cups of coffee in three days. Secondly, the high SES experimental condition increased coffee consumption from 10.04 (7.02) to 10.26 (6.03). Thirdly, the low SES control condition decreased coffee consumption from 11.00 (6.53) to 10.00 (5.29). And Finally, the low SES experimental group increased coffee consumption from 11.05 (3.24) to 11.59 (4.51) cups of coffee in three days.

Coffee consumption for all conditions combined showed no significant change over time,  $F(1, 68) = 0.070$ ,  $p = 0.792$ . Additionally, the change in coffee consumption over time within groups did not differ significantly across the groups,  $F(3, 68) = 0.442$ ,  $p = 0.723$ .

## Discussion

The goal of this research was to assess whether adult men with a relatively low SES respond differently to a descriptive social norm than men with a relatively high SES. The hypothesis was that the effect of social norms would be larger in men with a low SES. In order to investigate this matter, an experiment was conducted in which a group of low SES men and a group of high SES men were both divided over two conditions. The first was the experimental condition. Participants in this condition received a descriptive normative message aimed to increase water consumption. The second was the control condition. Participants in this condition received the same questionnaires as the experimental condition but without the social norm message. Providing a descriptive normative message did not produce a significant increase in water consumption in the experimental conditions compared to the control conditions which made either confirming or rejecting the hypothesis impossible. As a consequence of not finding a main effect, moderating effects of identification, self-identity and peer identity on social norm effects as well as the spillover effect were not able to be determined. Possible reasons and implications for not finding a main effect will be discussed next.

The first and most important issue that needs to be addressed when analyzing the results of this study is its sample sizes. Unfortunately, all of the samples ended up too small compared to what was calculated in advance. The high SES conditions ended up with 25 and 24 participants. This was still beneath the 26 that were calculated to be needed to show an effect. The low SES conditions were even fewer in number with 12 and 11 which made outcomes of this research less powerful. When looking at the results, Table 1 shows us that the high SES experimental condition increased their water consumption by 1.7 glasses in three days which was 0,4 more than the 1.3 increase of the high SES control condition. The low SES experimental condition increased their water consumption by 3.7 glasses in three days which was 1.0 more than the 2.7 increase of the low SES control conditions. As the amount of participants is used in calculating statistical significance, these outcomes in combination with the sample sizes are not enough to yield significant results. Had the conditions consisted of 100 participants each, these same outcomes could very well have been significant and could have showed us that social norms indeed produce a large effect in low SES individuals.

Secondly, both the control and experimental conditions increased their water consumption. Especially among the low SES conditions, water consumption increased tremendously. It is presumed that the weather played an important part in this phenomenon. This study took place in May, 2018 in the Netherlands. This month marked the start of a historic heat wave in which temperatures rose above 30 degrees Celsius, which is uncommonly high for the Netherlands. Since the low SES participants were all garbage collection employees, most of them spent their workdays outside in the sun. To cope with the heat they probably consumed more water than usual. This would explain their increase in water consumption. The high SES participants also increased their water consumption collectively, but most of them worked indoors reducing their need to consume a similarly higher amount of water to cope with the heat. Nevertheless, as all conditions increased their water consumption because of the weather, the differences in increases in water consumption between condition could be attributed to personal differences like how individuals cope with heat. Another possibility is that the effect of increasing water consumption through a descriptive norm message was reduced because water consumption was already increased due to the weather. It is not unthinkable that if the weather had not played a role, the control conditions would have maintained their water consumption and the experimental conditions had increased their water consumption by about two glasses in three days. Now that there was already an increase in water consumption, the social norm message had to produce an effect adding on that increase, which could have proven difficult. Thus the effect of the social norm message could have been reduced by weather interference.

The weather, however, might not have been the only factor responsible for not finding a main effect. Several other factors might have been limiting as well. Studies have shown us that descriptive messages promoting healthy eating behavior similar to the one used in this study are effective in producing an effect on health behaviors (Mollen et al., 2013; Robinson, Fleming & Higgs, 2014; Stok et al., 2012; Stok et al., 2014; Stok et al., 2016). The question is whether these effects last long enough to be able to be measured. Previous research has shown that a one-time descriptive normative message was able to produce an effect that was detected after three days (Stok et al., 2014) or during a week with repeated exposure (Stok et al., 2012). This research attempted to find an effect of a one-time descriptive normative message after seven days. It is possible that the effect of a one-time descriptive normative message does not extend so far. Stok et al. (2012) previously stated that further research is needed to investigate the duration of normative message effects. This research has done so and has possibly identified an exceedance of the upper limit of social norm effect duration.

The next factor that needs to be considered stems from a strongpoint of this study. The average age of the participants was approximately 49 as opposed to other research in which the participants were aged between eighteen and early twenties (Mollen et al., 2013; Rimal et al., 2005; Robinson, Fleming & Higgs, 2014; Staunton et al., 2014; Stok et al., 2012; Verkooijen, Stok & Mollen, 2015) or even fifteen (Stok et al., 2014). Investigating students' eating behavior tends to be effective as being a student away from home is found to be the one of the most important times in one's life when it comes to developing eating habits (Papadaki et al., 2007) next to early childhood in which the parents are the most important influential factor (Rogers, 1999). Therefore, priming students to eat certain foods through social norms has theoretical potential to work. This does leave the question, however, whether social norms' effectiveness is similar in adult populations in which eating habits are more anchored. It turns out eating habits are triggered by situational cues (Van 't Riet et al., 2011). These cues can be a physical environment but also a social environment. As habits are dependent on these situational cues, changing them (changing the social environment or social norm) makes sure a habit is not performed which leaves room for a new, replacing behavior that could ultimately develop into a new habit (Van 't Riet, 2011). In theory this works on people of all ages. In practice, this has not been shown by social norm research yet. Therefore, investigating whether age modifies social norm effects is recommended.

Not being able to determine moderating effects of identification, self-identity and peer identity as well as the spillover effect did not render the measurements useless. As self-identity as being a healthy eater did not differ between any of the conditions, perception of peer identity did. High SES participants saw their peers as healthier, not compared to themselves, but compared to how low SES saw their peers. Whether this is due to the fact that low SES participants' peers actually are less healthy than high SES peers is not able to be determined as this was not measured. However, the fact that low SES participants saw their peers as less healthy could already pose a problem as their perceptions determine the social norms that they encounter every day. Participants of this study might be affected by this norm which causes them to act less favorable in terms of health. This could also (partly) explain why the average BMI of low SES participants was 26.7, 2.3 higher than the 24.4 of the high SES participants. It would be advised to investigate whether regularly perceived peer identity overrule the potential normative effects produced by a study.

Finally, despite no main effect was found and consequently no spillover effect, the measurements of sugar-sweetened beverage consumption did yield some useful insight. Low SES participants were found to drink significantly more sugar-sweetened beverages than high SES participants. As sugar-sweetened beverages are obesogenic products (Hu, 2013), this could also (partly) explain the previously mentioned difference found in average BMI between the low SES and high SES participants. Low SES would therefore benefit from the spillover effect that might accompany increased water consumption, were it to exist. However, more research should be done to determine whether decreasing sugar-sweetened beverage consumption is a viable spillover effect from an increase in water consumption through social norm influences.

## Limitations

The first limitation of this study has already been mentioned. This is its sample sizes. During the recruitment of participants it was already noticed that reasonably less low SES individuals were willing to participate in this research. This is in line with Yancey, Ortega & Kumanyika (2007) who stated that low SES individuals are harder to recruit and retain into health related studies. Notifications and sign up lists' effectiveness was very limited as means of recruiting participants. Directly engaging individuals and asking them whether they would like to participate, however, seemed to yield the best results in terms of percentage of people willing to participate in this study. What is more, employees of the garbage collection companies were most open to participate when asked before their workday started. Unfortunately, this finding was only established at the last setting where participants were recruited.

Secondly, Levene's test for equality of error variance indicated that the error variance of the dependent variable was not equal across groups for several of the tests that were ran. This was due to the fact that the groups were uneven in size. When one group is more than 1.5 times larger than another, this assumption is at risk of being violated. Even though this does not increase the odds of falsely rejecting an actually correct hypothesis, it does reduce the power of the test. When this research is replicated, attention should be invested in recruiting either equal groups or a greater group of low SES participants as their response rate is likely to be lower than that of high SES participants.

The final limitation is actually also one of its strengths. This research is innovative in five aspects; 1) It investigated men only, 2) the mean age was 48.8, which is well above the ages of previously researched populations 3) different SES levels were compared 4) it investigated water consumption which is new in social norm research and 5) the effect of the social norm message was measured after a week, where three days was previously the longest period of time after which a social norm effect was found. All of these aspects are new and thus add to the existing literature. However, if only one of these aspects is an obstruction the production of social norms effects, no verdict can be given about the others. Therefore, the ambition of being innovative in five areas simultaneously could have been the unfortunate cause of not having found a main effect. Future research could benefit from taking a step back and investigate only one new factor at a time.

## Future research

Several recommendations for future research have been mentioned throughout the discussion. The first is identifying the time that one-time social norm message effects last. Thereby, future research could investigate whether the effect gradually diminishes over time or ends rather abruptly. This could be an interesting addition to the knowledge of the working mechanism of social norms. The second recommendation entails identifying whether age is a potential moderator for social norm effects. In theory social norms should not effect adults with set habits differently than they do students. However, proving this with a study is advised. The third recommendation is adding an investigating into whether regularly perceived norms conflict with social norm messages presented in a study. Receiving a social normative message while being confronted with contrasting information (perception of others) daily might reduce the effectiveness of the social norm message and thus diminish usable outcomes. The last mentioned recommendation concerned the spillover effect. If increasing water consumption does produce a spillover effect of reducing sugar-sweetened beverage consumption it is worth finding as it can help low SES individuals who are found by this study to drink more sugar-sweetened beverages.

Finally, in retrospect, the set-up of this experiment was good in terms of measuring the intended variables and sufficient in terms of external validity. If low SES individuals are indeed more susceptible to social norms, this study, properly executed, preferably on a larger scale and with less interference by factors like the weather would have found it. Replication is therefore recommended. As stated, recruiting a larger group of low SES participants is necessary as their response rate is likely to be lower.

## **Conclusion**

This research did not find a social norm effect on adult men. Consequently, no difference in the effect was found between high and low SES participants. This does not mean, however, that this difference does not exist. The hypothesis that social norms would have a larger effect on low SES men than on high SES men could neither be confirmed nor rejected. Additionally, the presumed moderators were not able to be determined due to not finding a main effect. An important issue in this research was low sample sizes, especially those of the low SES conditions. It is thought, however, that the research design used in this study is adequate in measuring the variables of interest. Upon replication, minor alterations could benefit the outcomes as the current study was highly ambitious through being innovative in five different aspects.



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