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# **THE POWER OF INJUNCTIVE NORMS**

THE EFFECT OF  
INJUNCTIVE NORMS TO  
STIMULATE HEALTHY  
EATING BEHAVIOUR  
AND THE EFFECT OF  
PSYCHOLOGICAL  
REACTANCE

**MASTERTHESIS**

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Master thesis

# **THE POWER OF INJUNCTIVE NORMS**

The effect of injunctive norms to stimulate healthy eating behaviour and the effect of psychological reactance

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## Summary in Dutch (NL)

In Nederland blijft het aantal kinderen en volwassenen met overgewicht stijgen. Sociale normen kunnen als instrument worden ingezet om eetgedrag te beïnvloeden. Er bestaan twee verschillende soorten sociale normen, descriptieve normen en injunctieve normen. Descriptieve normen ontstaan door het gedrag van andere mensen, de zogenaamde uitgevoerde normen. Het is 'populair' gedrag, meegekregen door bijvoorbeeld opvoeding en cultuur, dat wat we allemaal doen. Injunctieve normen zijn voorgeschreven, vaak maatschappelijk aanvaarde of wettelijke normen. Zij beschrijven wat we allemaal zouden moeten doen. In deze studie ligt de focus op de werking van injunctieve normen en de communicatie hiervan.

Om het effect van deze injunctieve normen te onderzoeken is op RijnIJssel Vakschool in Wageningen een experiment uitgevoerd. Ruim 150 studenten moesten zowel een creatieve opdracht als een smaaktest uitvoeren. Tijdens de creatieve opdracht kregen studenten te maken met een van de drie volgende situaties: een schaalpje M&M's, een schaalpje met M&M's bedekt met plasticfolie, een schaalpje met M&M's met daarbij een tekstbordje *'Het is beter om niet van de M&M's te eten tijdens het maken van de creatieve opdracht'*. Terwijl de participanten op verschillende manieren blootgesteld werden aan de M&M's, deden zij een creatieve opdracht en een smaaktest.

In deze studie wordt significant aangetoond dat injunctieve normen waargenomen worden als sociale normen en dus het eetgedrag van de participanten ontmoedigen. Studenten voelden zich minder vrij om M&M's te pakken wanneer zij werden blootgesteld aan een injunctieve norm gecommuniceerd via een fysieke cue (plasticfolie) en via tekst (bordje) in vergelijking met het 'open' schaalpje. Beide communicatie vormen werden als normatief ervaren.

Ook de overige resultaten van dit onderzoek naar het effect van injunctieve normen zijn interessant voor vervolgonderzoek. Bij injunctieve normen speelt psychologische weerstand, de behoefte aan autonomie en het gezondheidsdoel een rol. De effectiviteit van de norm kan hierdoor worden beïnvloed.

De wijze van communiceren van de injunctieve norm (fysieke cue (deksel, folie e.d.) of een tekst (instructie, gebod, advies) kan verschillen. Per situatie en per doelgroep moet gekeken worden naar de meest geschikte manier om de norm duidelijk te maken.

Werken met injunctieve normen vormt een interessante strategie om gezond eetgedrag te stimuleren of gezond gewicht te behouden. Hiermee zou de verleiding van ongezond eten kunnen worden weerstaan.

## Abstract

**Background:** The number of obese children and adolescents is still growing. Social norms can be used to influence and stimulate healthy eating behaviour. Therefore, descriptive and injunctive norms are examined. Previous research emphasized the differences between those norms or was mainly focused on the effect of descriptive norms.

**Aim:** This study investigates the effect of injunctive norms. To which extent injunctive norms communicated via text or via a cue do stimulate healthy eating behaviour. And if the effect of those norms is mediated by psychological reactance. Moreover, whether injunctive norms are moderated by need for autonomy and healthy eating goal.

**Method:** Students (N=156) participated in an experiment with seemingly another objective: finishing respectively a creativity task and a taste test. During the creativity task, students were confronted with one of the following situations: a bowl with M&M's covered with plastic wrap, a bowl with M&M's and in front a sign with written text or a bowl with M&M's without a norm. M&M's are well-known sweets, appreciated by almost everyone. Psychological reactance was measured between the creativity task and the taste test. During the taste test participants were allowed to consume as many M&M's as they liked.

**Results:** Results showed that both norms were perceived as social norms discouraging eating behaviour. No other significant effects were found for the difference between communication of the injunctive norms, also psychological reactance had no mediated effect. Participants did not report higher psychological reactance in one of the situations. Furthermore, the possible moderating effect of autonomous motivation and healthy eating goal could not be demonstrated.

**Discussion:** In this study, injunctive norms were perceived as social norms and participants felt less free to take M&M's in a situation with an injunctive norm. These norms do have an effect but the mediation and moderation effect need to be further investigated. Also, the aspect of communication of the injunctive norms and the attention of injunctive norms. The use of injunctive norms is an interesting strategy for stimulating healthy eating habits or maintaining healthy weight. Injunctive norms could help to resist the temptation of unhealthy food.

## Preface

This Master thesis is part of the Master Management, Economics and Consumer Behaviour at the Wageningen University & Research. I started in January 2018 with Sanne Raghoobar, PhD candidate at the Strategic Communication Group. Her research topic social norms fascinated me and made me decide to participate. I am interested in what motivates people to make (certain) decisions and especially their eating behaviour.

For this master thesis, I had the privilege to conduct the experiment at Vakschool RijnIJssel in Wageningen. I really liked the atmosphere, the people and the students. Despite the students were initially a bit anxious, I managed to persuade over 150 students to participate. I am very grateful to all the students of Vakschool RijnIJssel participating in the experiment. Also, many thanks to director Carel Rink, contact person Dave van Antwerpen and planner Wim de Haan for their support.

In particular, I would like to thank Sanne Raghoobar, for our fruitful discussions, her feedback, ideas and coaching during the experiment. I also would like to thank Ellen van Kleef and Emely de Vet for their critical feedback during the meetings and to give support to conduct the experiment at another location.

Many thanks to my roommates for their help during the experiment at Vakschool RijnIJssel and at last I would like to thank my family and friends for their interest and support. Especially my grandfather, who passed away in March.

I hope you will read my Masterthesis with joy and interest.

Rosanne Erasmus

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## 1.Introduction

According to a recent study by Imperial College London and World Health Organization (WHO) the number of obese children and adolescents (5-19 years) worldwide is still increasing (WHO, 2017). Being overweight has become a serious problem for many children and adults. Half of the Dutch adult population (49,2%) is overweight, of which 14,2% is obese (CBS, 2016). One of the main causes is the exposure to unhealthy foods in the environment. People are constantly exposed to food temptations and it is often difficult to resist those unhealthy options (Poelman, 2016). Besides, healthy nutritious food need to become more easily accessible at home, school or other places. Also, regulations, taxes et cetera should influence children not to eat unhealthy foods (WHO, 2017).

Other reasons for the problem mentioned above could be social influences or conforming to the desired behaviour, how most people behave or which behaviour is recommended. According to Deutsch & Gerard (1955) social influences have an impact on many psychological processes. The more an individual is uncertain about a judgement, the more the individual makes use of social influences to make judgments. Social influences are used to support and undermine individual integrity. From birth on, we learn that perceptions and judgments of others are trustworthy sources (Deutsch & Gerard, 1955). Furthermore, eating often happens in social context and many people are influenced by this; like dietary choices that need to correspond with close social connections or appropriate eating norms set by behaviour of other people having effect on our behaviour and choices (Higgs & Thomas, 2016). Indicating, social contexts are full of social norms. Social norms include (underlying) psychological processes that determine eating behaviour. Higgs (2015) defines social norms as: *"implicit codes of conduct that provide a guide to appropriate action."* Recently a number of studies showed that social eating norms have a large impact on overweight and the development of obesity (Christakis & Fowler, 2007; Brown, Hole & Roberts, 2014; Higgs & Thomas, 2016). As mentioned by Higgs (2015), social norms have a large effect on food choice and consumed amounts of food. Many people use norms to choose for their own food preferences. Considering that norms are an important determinant of eating behaviour, many studies have investigated whether social norms can also be used as a strategy to stimulate healthy eating (Burger et al., 2010; Prinsen, de Ridder & de Vet, 2013; Stok et al., 2014; Robinson, Fleming & Higgs, 2014; Higgs., 2015; Stok et al., 2015 and Stok et al., 2016)

A distinction can be made between two types of social norms affecting behaviour, descriptive norms and injunctive norms. Cialdini, Reno & Kallgren (1990) developed the Focus Theory of Normative Conduct. This theory defines those two types of social norms. Descriptive norms can be best explained by *"if everyone is doing it, it must be a sensible thing to do"*, those norms describe the behaviour of others (Cialdini, Reno & Kallgren, 1990). Injunctive norms are defined as moral rules that people approve or disapprove. Injunctive norms refer to behaviour what is expected, what ought to be done or how people should act (Cialdini, Reno & Kallgren, 1990). An example of a descriptive norm is imitating an action of others by checking what most others are doing. In the article of Cialdini, Reno & Kallgren (1990) they used a confederate that dropped litter into the environment to see if other people reacted on the state of the environment. It looked like it was a common thing to do. When people would follow



this behaviour, it was indicated as a relevant descriptive norm. To examine an injunctive norm, they used piles of swept litter, initiated as an injunctive norm. In the experiment, they expected that this would decline people to litter the environment.

According to Stok et al., (2014) social norms, descriptive norms and injunctive norms have an impact on stimulating healthy eating behaviour. In this study, they examined the fruit intake intention and follow-up intake of norm message manipulations among high school students. They showed that descriptive norms had a positive effect on fruit intake intentions and that injunctive norms had no positive effects on fruit intake but provided even a decrease in fruit intake intentions. It could be argued that injunctive norms caused a kind of resistance and reactance. This is a behavioural response of a person to protect a threatened sense of behavioural freedom defined by Brehm (1966) as the Theory of Psychological Reactance. In the study of Stok et al., (2014), people probably feel pushed by this injunctive norm. It limited their freedom and evoked a kind of resistance to the proposed behaviour. Therefore, participants reported lower fruit intake intentions. Participants who received descriptive norms acted opposite, thereby the norms were functioning like heuristics (Stok et al., 2014).

Social norms can be communicated in different ways. Many studies about social norms focused on norms communicated via text (Jacobsen, Mortensen & Cialdini, 2011; Stok et al., 2014; Robinson, Fleming & Higgs, 2014). Recent studies showed that social norms can also be communicated via physical cues in food environments. For example, the study of Prinsen, de Ridder & de Vet (2013) about the effects of environmental cues on dietary decisions. They used food wrappers as a physical cue to communicate the norm. This will steer behaviour because people will look at what others have done. If people are exposed to empty food wrappers, it can indicate that other people already have eaten the product. Besides, this will give people behavioural guidance when they are unsure or unfamiliar (Cialdini & Goldstein, 2004; Prinsen, de Ridder & de Vet, 2013). The study of Prinsen, de Ridder & de Vet (2013) took place in a local bakery and in a lab setting. A bowl with individually wrapped chocolates was used. The participants were not specially made aware of this bowl. The presence of empty wrappers was manipulated to show what people before had or had not eaten. They used healthy and unhealthy snacks to see if people conformed to environmental cues. Participants grabbed more chocolates in the presence of an environmental cue indicating that others grabbed too. Also, participants were more inclined to choose a snack that was consistent with the choice of others (Prinsen, de Ridder & de Vet, 2013). The individually wrapped chocolates are seen as indicators of food temptations and will be easily recognized by people. Furthermore, cues of how others behaved previously are for an individual more subtle and unrecognizable. In the presence of empty wrappers, people were more inclined to choose this unhealthy snack. According to Prinsen, de Ridder & de Vet (2013) people are approachable for suggestions of the eating behaviour of others. This could be used to support healthy eating behaviour. Lately other researchers have also found that injunctive norms communicated via cues have an impact on behaviour of people and can help stimulating healthy eating behaviour (Raghoebar, van Kleef, de Vet, in preparation). They did different experiments at different locations with presence or absence of a cover over snack bowls (for example a transparent lid covering a jar or a bowl with snacks covered by plastic

wrap), to test whether injunctive norms could be communicated via physical cues. The results show that injunctive norms communicated via cues, such as a cover, could discourage unhealthy eating. A small cue in the environment was effective and it seems a promising strategy to stimulate healthy eating (Raghoebar, van Kleef, de Vet, in preparation). Another study by Stok et al., (2015) presented that communicating rules via suggestions was more powerful than via restrictions. They showed that restrictive rules led to more psychological reactance in participants.

The extent to which communicated injunctive social norms influence healthy food choices is not quite clear at this moment (Zandstra, Carvalho & Van Herpen, 2017). In this study, an injunctive norm communicated via text versus a physical cue and control condition will be examined. The main research question is constructed as follows: *“To what extent can injunctive norms communicated via text or via cues stimulate healthy eating behaviour and what is the effect of those norms on psychological reactance of Dutch consumers?”* In total four hypotheses will be tested.

It is expected to find a difference between an injunctive norm communicated via text and an injunctive norm communicated via a cue. Therefore, the first research question is: *What is the influence of injunctive norms communicated via text or via cues on healthy eating behaviour of Dutch consumers?* It is proposed that norms communicated via cues have more impact on stimulating healthy eating behaviour than norms communicated via text because cues are more hidden and subtle. Hereby it is expected that less reactance occurs when an injunctive norm is communicated via a cue. We propose that injunctive norms communicated via text are formulated forceful and this will induce psychological reactance. This should be less for an injunctive norm communicated via a cue because this is a more subtle way of communicating. Psychological reactance occurs when people feel not free to behave, either an aversive reaction to perceived behavioural freedoms. This will be examined with the help of the research question: *What is the effect of injunctive norms communicated via a cue or via text that stimulate healthy eating behaviour on psychological reactance of Dutch consumers?* It is also expected that psychological reactance occurs when people are exposed to strategies which stimulate healthy eating via injunctive norms. We propose that this probably depends on need for autonomy. People who have a high need for autonomy, experience more psychological reactance than participants who have a lower need for autonomy. When injunctive norms are introduced, it could be that people feel affected by those norms. In a way that people feel they cannot behave freely and their motivation disappears. Therefore, autonomous motivation becomes controlled motivation (Ryan & Deci, 2006). According to Smit et al., (2017) *“people are assumed to perceive themselves to be autonomous in their motivation to change when behaviour is accompanied by an experience of psychological freedom of choice”*. Also, according to Ryan & Deci (2006) motivation is an important variable. Someone with autonomous motivation is creative and behaves more joyfully. The best way to motivate other people is through autonomous motivation, because people still have the opportunity of self-direction and the choice acknowledgement of feelings (Ryan & Deci, 2006). People have a need for autonomy, that is freedom to behave and choose what they like. This study investigates whether autonomous motivation could have an effect on psychological reactance. Therefore, it is expected that when people have the motivation to eat healthy, they will automatically consume less or consume healthy products. When

people are autonomous motivated, they will consume whenever they want and if they are hampered, they will compensate by consuming more or consume when it is discouraged to consume (Ryan & Deci, 2006). Furthermore, the role of healthy eating goal is also examined as a moderator. It could be that a moderator changes the relation between the other two variables. When people have as goal to eat healthy, the relationship between injunctive norms and psychological reactance could be affected. The effect of those two moderators will be examined *by: What is the role of autonomous motivation of Dutch consumers on the effect of injunctive norms (text based norm communication versus cue based norm communication) which stimulate healthy eating behaviour?* and *What is the role of health goals of Dutch consumers on the effect of injunctive norms (text based norm communication versus cue based norm communication) which stimulate healthy eating behaviour?*

To achieve answering the main research question, an experiment will be conducted, partly inspired by the study of Stok et al., (2015). The experiment broadly consists of two parts: a creativity task and a taste test. At first, participants have to complete a questionnaire. Then the manipulation starts, the participants are exposed to a bowl with chocolates (M&M's) and have to perform a creativity task. In this phase participants are assigned to three conditions (condition 1: bowl with M&M's covered with plastic wrap, condition 2: bowl with M&M's and a sign with text, condition 3: bowl with M&M's without plastic wrap or a textual sign). In the last stage participants have to perform a taste test, where they are asked to rate the M&M's. After the creativity task, psychological reactance of participants is determined by a questionnaire. Amount of M&M's consumed is both measured during the creativity task (immediate effect on consumption) and taste test (after effect on consumption). The results of this study will provide a better understanding how to implement injunctive norms to steer people to eat (more) healthy. Furthermore, the results can contribute to the existing research about injunctive norms, the different ways of communicating, the effect of psychological reactance and the moderating variables. Also, the results could be used in real life situations. They could help social stakeholders that strive for healthy individuals and help people to maintain a healthy weight.

## 2.Theoretical background

### 2.1 Social norms

Social norms are unwritten rules about how to behave and social norms are accepted standards of behaviour of social groups. Individuals in a social group try to conform to that behaviour (Burke & Young, 2011). When people cannot make decisions independently, they will, for instance, look how others behave and assume that is the right behaviour. Burke & Young (2011) also relate social norms to a positive feedback loop between behaviour of an individual and group behaviour. The more people are motivated, the more they will act in line with the norm. Whether people follow a certain social norm depends on if the norm is perceived as relevant and how much attention is paid to the norm (Burger et al., 2010; Higgs & Thomas, 2016). Social norms are an outcome of human interaction, without any reference social norms arise, like informal, public and shared rules (Bicchieri & Muldoon, 2011). Cialdini, Reno & Kallgren (1990) especially focus on the attention of a norm. They showed that someone without focus will not act according to the norms. This means that the norm where people are most focused on, the norm that is most salient will lead to behaviour change. Cialdini et al., (1990) also showed that descriptive and injunctive norms can both have an impact on behaviour but the norm that gets most attention is key. The norm that gets most attention will be followed. Besides attention, social acceptance (the order to fit in) and other kinds of competing norms that are involved at that time also play a role (Higgs & Thomas, 2016). When a norm matches people's behaviour, people get involved in processes like changing their food preferences, synchronize eating actions or monitor consumption. For example, eating the same amount as people you can identify with or conforming to a group by eating the same amount of food (Higgs & Thomas, 2016).

Several studies have examined if norm based messages are effective to promote healthy eating intentions and behaviour (Prinsen, de Ridder & de Vet, 2013; Stok et al., 2014; Higgs & Thomas, 2016). The healthy eating intentions and behaviour of others can be displayed to stimulate a dietary change. When people eat in appearance of social connections, their eating choices will be influenced. For example, by eating together, modelling the eating behaviour of adults, peers and parents or visible evidence of consumption (e.g. empty wrappers). People follow these eating norms to get connected with a social group and to behave correctly. Also, other people can influence the choices of an individual. Both adults and children are influenced by perceptions of eating behaviour of others. Therefore, social norms can help healthy eating and weight loss challenges (Higgs & Thomas, 2016).

Furthermore Robinson, Fleming & Higgs (2014) showed that the behaviour of others can be used as adaptive information to follow. In their experiment, they used a descriptive norm message that suggested that other students consumed vegetables, an injunctive norm message that suggested what others approved and a health message. Young adults consumed significantly more vegetables when exposed to the descriptive norm message than exposed to the health message. The injunctive social norm message had the same effect as the health message. The effect of the messages was only applicable

for consumers who normally did not consume much fruit and vegetables (Robinson, Fleming & Higgs, 2014). For them the descriptive norm worked best to stimulate people to eat more fruit and vegetables.

### 2.1.1. Descriptive and injunctive norms

As explained in the introduction, there are two types of norms: descriptive norms and injunctive norms. They can influence consumers' attitudes, intentions, and product choice. The distinction between descriptive and injunctive norms is sometimes blurred because if a norm describes what most other people do (descriptive), it could become "*people should do this*" (injunctive) (Jacobsen, Mortensen & Cialdini, 2011; Burchell, Rettie & Patel, 2013). Descriptive norms are relevant for the intrapersonal goals (e.g. emotion, attitudes) of an individual, like choosing correctly. The information that an injunctive norm allocates is relevant for the interpersonal goals (e.g. culture, social status) of an individual like social approval; the acceptance of a person by a social group (Jacobsen, Mortensen & Cialdini, 2011). Jacobsen, Mortensen & Cialdini (2011) conducted an experiment to examine the effect between the two types of norms and self-regulatory capacity. Their objective was to demonstrate that less self-regulatory capacity increases the effect of descriptive norms but decreases the effect of injunctive norms. They found that when self-regulatory capacity was low, the effect of the injunctive norm was smaller than the effect of the descriptive norm (Jacobsen, Mortensen & Cialdini, 2011).

An injunctive norm is likely to cause a conflict experience about decisions to conform or not conform. This is because of the duelling goals of injunctive norms. For example, people have to choose between behaving according the injunctive norm or what people might rather do. Descriptive norms should not stimulate conflict with injunctive norms because a descriptive norm is relevant to a single intrapersonal goal (Jacobsen, Mortensen & Cialdini, 2011).

People have different levels of cognitive deliberation, they also process the information of norms differently. For example, cognitive deliberation could be thinking about the message. People can generate responses (multiple thoughts) to the received information and the responses will predict attitudes. On the one hand people's thinking about social norms can be active or freely but it could also be that thinking is obstructed. For example, by time pressure or exhaustion (Melnik et al., 2011). In an experiment by Melnik et al., (2011) it was shown that when people scored higher on cognitive deliberation the effect of descriptive norms improved. But they also state that when cognitive deliberation is low or not present injunctive norms are more effective than descriptive norms.

### **Descriptive norms**

Previous studies have shown that descriptive norms are more influential and create stronger associations than injunctive norms (Stok et al., 2014). Also, more studies are available investigating the effect of descriptive norms because they indicate the most prudent course of action (Burger et al., 2010). Those norms are about how others act in an effective way. As noted in the previous paragraph descriptive norms providing information about the eating behaviour of others have more effect on food choices (Robinson, Fleming & Higgs, 2014). In previous studies, norms are often communicated via text (Stok, Ridder, de Vet & Wit, 2014; Robinson, Fleming & Higgs, 2014; Zandstra, Carvalho & Van Herpen,

2017). Text based norms are short messages, often one single sentence with information. But norms can also be communicated via cues (Burger et al., 2010; Prinsen, de Ridder & de Vet, 2013), as mentioned in the introduction. An example of descriptive norms communicated via cues are empty wrappers. Descriptive norms communicated via cues have effect on people's choices. When people are exposed to such cues that participants have chosen healthily they are also inclined to do the same (Prinsen, de Ridder & de Vet, 2013).

### **Injunctive norms**

Injunctive norms do not include information about behavioural effectiveness like descriptive norms but they contain a kind of power, what one should do; "good" behaviour is rewarded and "bad" behaviour, behaviour against the norm is punished. That is why injunctive norms can have a positive and negative effect on behaviour (Melnik, Herpen, Fischer & van Trijp, 2011). Burger et al., (2010) defined injunctive norms as "*societal standards for how people should act in a given situation*". For example, they guide people to tell they should eat healthy foods and limit the amount of unhealthy food. For some people, this could feel as a dual goal, following the injunctive norm or doing what you think is best. Previous research showed that injunctive norms could lead to decision making conflict or reactance. An example is the study of Stok et al., (2014) whereby people reported lower fruit intake because of the occurrence of psychological reactance. They consumed less fruit because of the injunctive norm message.

Many studies investigated injunctive norms communicated via text. Less studies can be found about injunctive norms communicated via cues. In this study recent findings (Raghoebar, van Kleef, de Vet, in preparation) and results of a new experiment will be included to show if injunctive norms communicated via cues can influence eating behaviour. Obviously, injunctive norms communicated via cues are effective because the cues are subtle and create less resistance in comparison with injunctive norms communicated via text. More research is needed to explore the opportunities of injunctive norms communicated via cues.

## **2.2 Psychological reactance**

Descriptive and injunctive norms communicated via text or cues stimulate certain behaviour. When people feel stirred, those norms could elicit psychological reactance. Resistance could occur when they experience they do not have the freedom to make their own choice. The theory of psychological reactance states that individuals have certain freedoms with regard to their behaviour (Brehm & Brehm, 1981). If these behavioural freedoms are reduced or threatened, the individual will be motivated to regain freedom.

The reactance theory is based on two main elements: freedoms and threats. The reactance-arousal or amount of reactance that is induced depends on the individuals' importance of freedom and the magnitude of the threat. Threats that make the outcome uncontrollable will induce reactance. The magnitude of reactance will be determined by characteristics of freedom like importance or relative importance compared with other available freedoms (Brehm & Brehm, 1981).

People could feel pushed by an injunctive norm compared to a descriptive norm. In their experience, people cannot control the situation and reactance will be present. This will limit their freedom and may evoke resistance to the proposed behaviour (Stok et al., 2014). People want to believe they possess certain freedoms. Sometimes they do not feel free or cannot act freely. For example, when prohibited using a phone, persuaded to buy a specific product, forced to pay tuition fees et cetera. As a result, people can feel uncomfortable, hostile, aggressive or angry (Steindl et al., 2015). It could also result into actions of undesirable behaviour. It depends on the individual whether he or she perceives the freedom as important. The stronger the need for freedom, the larger the resistance. Also, when several freedoms are threatened, the reaction is greater (Brehm & Brehm, 1981). The magnitude of reactance also depends on importance or attractiveness of the alternatives. For example, choosing between an apple and an orange will create little reactance because it is not of great importance which one someone is having for lunch. The amount of reactance is greater if the importance of freedom that is threatened is greater. Also, the number of freedoms that are threatened are of importance. For example, it is different when someone is asking you to stop chewing gum one time than forbid you to chew gum forever (Brehm & Brehm, 1981).

Stok et al., (2015) did research on suggested and restrictive rules. If for example the rule is not to consume unhealthy food (restrictive), people experience this as a limitation of their choices. To maintain their freedom, people will behave opposite, they will not do what is asked and thus will consume unhealthy food. A restrictive rule tells people what they need to do. A suggested rule gives a suggestion whereby someone can decide themselves to act or not. Restrictive rules cause more psychological reactance compared to suggested rules. They did research on the effect of restrictive versus suggested rules to limit consumption, measuring the after effects and also whether psychological reactance plays a role. It is of great importance to know what the impact of restrictive and suggestive rules are to ensure the best outcome (Stok et al., 2015). The effect of restrictive rules could in some cases be similar to the effect of injunctive norms. In a way that behaviour could be approved or disapproved and that people feel obligated to follow the norm. The effect of the way in which the norms are communicated in the study by Stok et al., (2015) are promising for the future. This can have a large impact on the effect of psychological reactance and offers a clear perspective to injunctive norms communicated via cues. In this study, the reactance of injunctive norms communicated via text and via a cue will be examined.

### 2.3 Autonomous motivation & Healthy eating goal

According to Higgs and Thomas (2016) restricted investigation is available whether people are more amenable to the influence of social norms on eating behaviour. It could be that the motivation to behave in a certain way plays a role and or healthy eating goal. The self-determination theory (SDT) is a theory of human motivation, mostly used in a health context. This theory is used because SDT recognizes autonomy as a human need. In the SDT model three basic psychological needs are key: autonomy, competence and relatedness. Autonomy is highlighted as: "*The perception of being the origin of one's own behaviour and experiencing volition in action.*" Results show that autonomy and autonomy support are important predictors of healthy behaviour and psychological well-being (Edmunds, Ntoumanis &

Duda, 2007; Ng et al., 2012). One can provide support for autonomy by provoking and admitting a person's viewpoint, conveying choice and offer logic motives (Deci et al., 1994 & Smit et al., 2017). It can be a valuable approach to promote autonomy. According to Ng et al., (2012) a growing number of researchers is using and examining the SDT for the maintenance of people's healthy lifestyle. Positive connections are found between satisfaction and autonomous forms of self-regulation (Ng et al., 2012).

Also, the self-determination theory (SDT) makes a distinction between controlled motivation and autonomous motivation. Controlled motivation has negative consequences for performance and wellbeing because people who are controlled motivated take the shortest path to the desired outcome. People feel forced and tempted to behave in a certain way (Ryan, Partick, Deci & Williams, 2008). Autonomous motivation is quite opposite, people's behaviour will be more creative and stimulate positive emotions, people have more interest and enjoyment. People who are autonomously motivated have a greater responsibility and feel responsible for their actions (internal sources) (Ryan & Deci, 2000). For example, when someone is studying for autonomous reasons, there is no attention for external influences. If someone is studying for controlled reasons, one will study when other people study, in preparation for an exam or study not at all (Koestner et al., 2008). Hereby, people differ in need for autonomy.

According to Ryan & Deci (2000) autonomy support in relationships with authority (for example a teacher, doctor, coach, boss or parent) is the best way to motivate other people. Therefore, people will motivate themselves. Autonomous motivated behaviours are not natural. According to Ryan & Deci (2000), social environments and interventions need to focus more on motivation. Teixeira, Patrick & Mata (2011) concluded that motivation plays a main role in the capacity to adopt and sustain healthy diets. They also think social environments can include more forms of motivation to help people change their behaviour. According to Smit et al., (2017) autonomy support is an important component of motivation for health behaviour change. The theory of psychological reactance states that when people are restricted in some way they have a need to fight back to regain their freedom. It is a result of a person's drive to protect the perceived personal freedom (Brehm, 1966). As indicated before, need for autonomy can lead to contrasts, different viewpoints or choosing another option in relation to a norm, which could lead to psychological reactance. In this study, it is expected that if someone's motivation is in line with the norm, psychological reactance will be less and the norm will be followed. If the motivation differs from the norm, psychological reactance will become greater and people will not follow the norm.

Likewise, autonomous motivation, it is expected that less resistance is created when people have a goal to eat healthily, because the norm is in line with their personal goals. To tackle the obesity epidemic and prevent overweight, people need to become aware of their health. Healthy eating contributes to an overall sense of well-being. Every day, people have to make numerous decisions about their eating behaviour. Many of those decisions are made with low level of conscious awareness. This means making decisions without control or negotiation (Teixeira, Patrick & Mata, 2011). Healthy eating routines can be described as automatic and planned processes promised to support healthier eating practices



(McCarthy et al., 2017). Health behaviour can be explained with the help of the role of the self. The self can be divided into identities and when people are motivated they will verify a certain identity. When someone is motivated to eat healthy, one will behave to this identity and eat healthily for example (Strachan & Brawley, 2009).

### 3. Hypotheses and conceptual model

As noted, injunctive norms can influence eating behaviour and intentions. Injunctive norms can be communicated via text or via cues. Stok et al., (2016) concluded that environmental cues are capable to steer people's decisions concerning food intake and food choice. Those cues are subtle and unrecognizable by the individual. They do not only influence healthy food choices but also unhealthy choices. Injunctive norms communicated via cues are more subtle than text, therefore it is expected that they will influence healthy eating behaviour more than injunctive norms communicated via text. Another reason is that injunctive norms communicated via text often create psychological resistance. People feel stirred and this will interfere with their desire for autonomous decision-making (Brehm & Brehm, 1981). In previous experiments about injunctive norms and eating behaviour, researchers tested the intake of chocolates by using a transparent jar and manipulated the presence or absence of a transparent lid covering the jar. Results showed that significantly less chocolates were taken when the transparent jar was covered by a transparent lid in comparison with the jar without a transparent lid (Raghoebar, van Kleef, de Vet, in preparation). Therefore, it is expected that consumers who process injunctive norms communicated via a cue will have more effect on eating behaviour than injunctive norms communicated via text.

*H1: Injunctive norms communicated via text have less influence on (healthy) eating behaviour of Dutch consumers than injunctive norms communicated via cues.*

The study of Stok et al., (2014) showed that feelings of psychological reactance occur more in combination with an injunctive norm than with a descriptive norm. The injunctive norm had no positive effects on fruit intake and even decreased the fruit intake intentions of people. They think injunctive norms cause a kind of resistance (Stok et al., 2014). According to the theory of psychological reactance, people will fight back to regain their personal freedom (Brehm, 1966). It is expected that norms communicated via cues are more hidden than norms communicated via text. Psychological reactance leads to behavioural but also cognitive effects (Steindl et al., 2015). When recording an injunctive norm communicated via text, we suggest that more cognitive capacity is needed. Cognitive capacity means that people need their brains to process information. When a norm is communicated via a cue, it is expected that people will perform in a more automatic way. This could be because the cue is more hidden and people will behave without thinking. In this way, injunctive norms communicated via cues could lead to less psychological reactance:

*H2: Injunctive norms communicated via text lead to more psychological reactance than injunctive norms communicated via cues in the environment.*

*"Motivation concerns energy, direction, persistence and equifinality--all aspects of activation and intention"* (Ryan & Deci, 2000). Motivation is a predictor for behaviour and closely linked to psychological

reactance. Why do people sometimes do exactly the opposite? Psychological reactance occurs when people are not free to make their own choice. The definition of psychological reactance by Brehm (1966) includes: “a motivational state...”. The amount of a person’s motivation can predict the amount of a person’s behaviour. Autonomy support is an important element of motivation for health behaviour change (Smit et al., 2017). Autonomous motivation occurs when someone has identified the activities’ value and when it is in line with their self-esteem (Ryan, Deci & Williams, 2008). It is proposed that if motivation is in line with the salient norm, psychological reactance will decline. When people with autonomous motivation are exposed to an injunctive norm, more psychological reactance will occur. People will behave by their own experiences, ideas and choices (Steindl et al., 2015). This could be conflicting with healthy eating behaviour.

People’s choice to follow a healthy or unhealthy diet is a behavioural choice made by the self. For example, when someone has the motivation to eat healthy, one will behave to that identity and eat healthily (Strachan & Brawley, 2009). Furthermore, it is expected that when people have the goal to eat healthily, reactance will be lower when an injunctive norm communicated via text or cues is presented. Psychological reactance will be higher when people do not have a healthy eating goal. As mentioned in the introduction, people who have the motivation to eat healthy, will behave to that identity and eat healthily. If people do not have this intention, they will behave differently (personal goals).

*H3: If Dutch consumers have a need for autonomy they will show more reactance on injunctive norms communicated via text and cues than when consumers score low on need for autonomy.*

*H4: If Dutch consumers have as goal to eat healthy they will show less reactance on injunctive norms communicated via text and cues than when consumers do not have a healthy goal.*

The conceptual model is illustrating the described relationships and concepts and will be examined by an experiment. The concept *injunctive norms* operate as the independent variable and will be manipulated. Three conditions will be used (two manipulations and one control condition), an injunctive norm communicated via a cue and an injunctive norm communicated via written text. The cue used in the experiment is plastic wrap, the text that will be used is a small sign including written text. Both function as a injunctive social norm. The concept *psychological reactance* operates as a mediator and as an outcome variable (two arrows). It could be that because of the exposure of injunctive norms participants will react different (show reactance) or that participants when they are free to consume, express their reactance by over-consumption. Furthermore, it is expected that when participants process the injunctive norms, this will be moderated by *autonomous motivation* and *healthy eating goal* (personal norms). It is expected that participants who have a lower need for autonomy and have a healthy eating goal are more likely to follow the communicated norm compared to participants who have a high need for autonomy. The concept *consumption* means how much and whether participants consumed chocolates. The four hypotheses are presented below in a conceptual model (Figure 1).

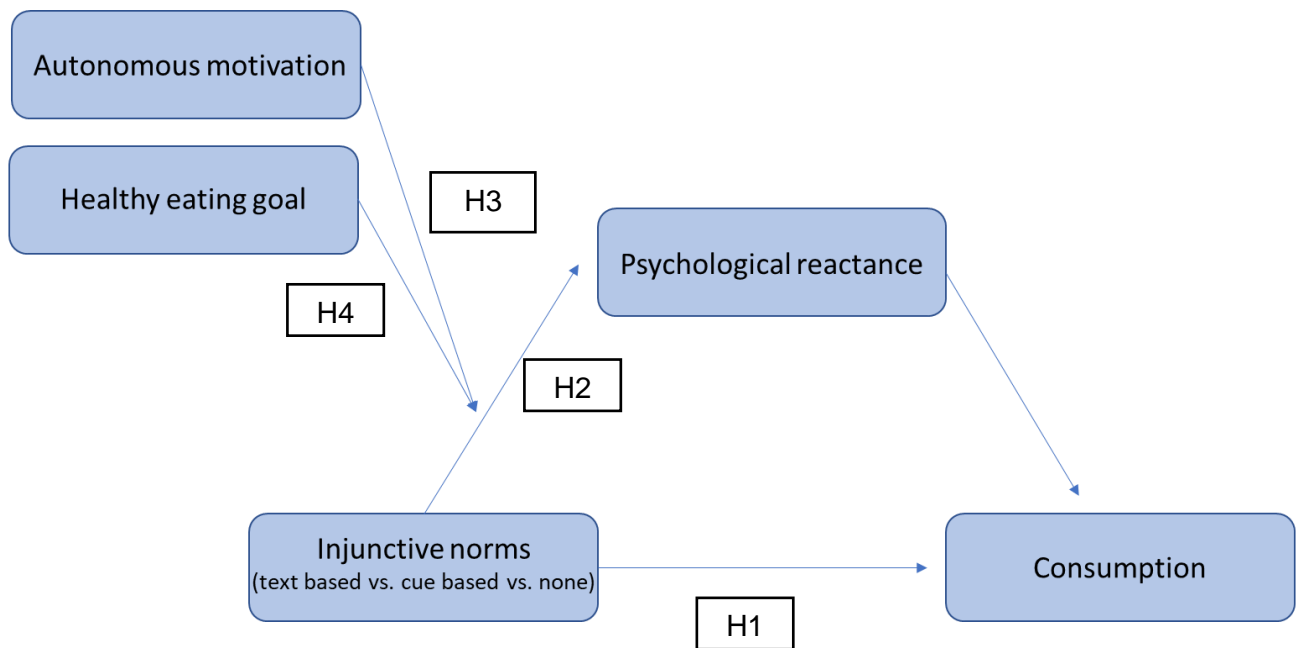


Figure 1. Conceptual model.

## 4. Methods

### 4.1 Participants

A total of 156 students, including a pilot study, from Vakschool RijnIJssel in Wageningen participated in the experiment. Vakschool RijnIJssel offers secondary vocational education. Their main streams of education are hospitality and bakery but they also offer leisure & tourism and facility management. The group consisted of female and male students aged between 16 and 27. They were recruited via posters, flyers and promotion talks given by the experimenter in between breaks of classes (Appendix 1.8). Participants received a VVV-voucher of 5 euros as reward for their involvement in the experiment. Participants were randomly and individually assigned to the three conditions. After excluding the participants of the pilot study (P=6) and participants who were lactose intolerance (N=3), data of 147 (69 males and 78 females) participants were applicable to analyse. The taste test was part of the cover story and not the purpose of the experiment. For this reason, students who did not consume chocolates were also included. Each condition (1,2 and 3) consisted of N= 49 participants.

### 4.2 Design

The experiment was being held in a room at Vakschool RijnIJssel in Wageningen. The room was close to the school cafeteria and the room could be closed to give the participants time to work in silence. The questionnaires administrated using Qualtrics Survey Software, a common tool for designing online questionnaires. We used a between-subjects experimental design with three conditions in which participants were exposed to a tempting chocolate snack. In the study, a white bowl was used (193 g). The bowl was filled with approximately 230 grams of M&M's. M&M's are small chocolates of different colours (blue, red, yellow, green, orange and brown). M&M's were used because chocolate is a popular product, M&M's have a small unit size and it is a snack that people can eat every moment of the day (Appendix 1.1 - Figure 1). The way the chocolates were presented to participants varied between conditions. In the first condition, an injunctive norm signalling that one could better not eat from the M&M's while performing the creativity task was communicated via a cue. This was done by putting plastic wrap over the bowl with chocolates. In the second condition, an injunctive norm stating that *"it is better not to eat from the M&M's while performing the creativity task"* was communicated via text. A small paper including the message mentioned before was positioned in front of the bowl with chocolates (Figure 2). Beforehand, an informed consent was used to ask permission about the intended study. The dependent variables were immediate effects of snack intake (grams) and after effects of snack intake (grams), which were indicated by how much chocolates (M&M's) a participant took. Psychological reactance was a mediator variable (and an outcome variable), if and how much resistance someone performed. The three different conditions, injunctive norm communicated via a cue, injunctive norm communicated via text and control condition, were independent variables. This was changed by the experimenter to test the dependent variables. Need for autonomy and healthy eating goal were moderators. It was examined if those variables changed the interaction between the independent and dependent variables.

#### Condition 1



#### Condition 2



#### Condition 3



Figure 2. A representation of the three conditions (source: own depiction)

### 4.3 Procedure

The experiment consisted of four stages, (1) general questionnaire, (2) creativity task, (3) second questionnaire and (4) a taste test. All participants were recruited for a study about the influence of creativity on taste (cover story inspired by Stok et al., 2015). A pilot study was conducted beforehand to test if the experimental manipulation was successful, six students (two students in each condition) participated in the pilot study. The participants of the pilot study were excluded because two extra sentences were added in the script (Appendix 1.1) of the experimenter and the weight of the M&M's including the bowl after the pilot study was structured between a strict range [385g-435g]. When participants arrived at the location of the experiment, they had to give permission for participation by signing the informed consent (Appendix 1.2). The experimenter presented all participants a number to link to the correct condition to the questionnaires. First, the participant had to complete a questionnaire to determine demographic characteristics (age, gender, education), hunger state, desire, overall-liking for chocolate, level of relaxation, healthy eating goal and need for autonomy. In addition, four filler items were added to prevent participants from knowing the actual purpose of the study. Hereafter, a white bowl filled with M&M's was placed on another table and the participant was asked to take a seat. The experimenter explained to the participant that the test consists of two parts. In the first part the participant had to perform a creativity task and in the second part the participant had to assess the taste of the chocolates. Beforehand all participants were informed by the experimenter that they had to complete the creativity task and the taste test. Before they could continue to a next step, they had to complete the previous step. Regarding the first part, the experimenter provided instructions for the creativity task,

which is the same in each condition. The creativity task is inspired by previous studies that also used a creativity task in their experiments (Guilford, 1967; Stok et al., 2015). In this study, the participant had to write down as many as possible ideas, for a new bakery or restaurant with the help of five questions (Appendix 1.4). Participants had seven minutes to perform the creativity task to make sure every participant was exposed to the M&M's the same amount of time. In each condition, the experimenter invited the participant to perform the creativity task. In the first condition the bowl filled with M&M's was closed with plastic wrap. In the second condition the bowl was filled with M&M's without plastic wrap but presented with a sign in front of the bowl consisting of the following message: *"It is better not to eat from the M&M's while performing the creativity task"*. The plastic wrap and the written message contain a social injunctive norm discouraging snack intake. In the control condition, the bowl was filled with M&M's without plastic wrap or a sign. After seven minutes, the experimenter removed the materials related to the creativity task. Also, the experimenter told the participant that the bowl with M&M's is not full enough and that all the participants need to have the same amount of M&M's because they have to taste and rate the M&M's later on (inspired by work of Stok et al., 2015). Without presence of the participant, the experimenter determined snack intake during the creativity task (immediate consumption) while the participant received the second questionnaire about psychological reactance and social norms. Furthermore, perceptions of social norms were measured (manipulation check). After the questionnaire, the participant had to assess the M&M's in a taste test. During the taste test, participants had to indicate how sweet, crunchy the M&M's tasted and participants were free to eat as much chocolates as they wanted. In all conditions, the participants were invited to taste the chocolates (without plastic wrap or a sign). After five minutes, the bowl was taken away and the experimenter asked the participant to fill in final questions about allergies, intolerances and the true purpose of the experiment (Appendix 1.7). The participants were thanked for their participation. Without presence of the participants, the bowl with M&M's was weighed again by the experimenter to indicate how much M&M's participants consumed during the taste test (after effects).

#### Manipulation

The experiment consisted of three conditions; a bowl filled with M&M's closed with plastic wrap (1), a bowl filled with M&M's presented with a sign in front of the bowl with the following message: *"It is better not to eat from the M&M's while performing the creativity task"* (2) and a bowl filled with M&M's without plastic wrap or a sign (3). By means of the manipulation it was examined whether the injunctive norms were perceived as social norms.

#### 4.4 Measures

As observations and registration had to be conducted by one researcher, about 14 students a day was the maximum, the experiment was performed in approximately four weeks. All items were measured with a 5-point scale.

## Outcome variables

### Immediate effects (snack intake)

The amount of M&M's consumed (snack intake) was measured after the creativity task in all three conditions, without presence of the participant. Every time a participant was participating in the experiment the bowl (including M&M's) was weighed beforehand and afterwards, with the participant not being present. A standardized weight of 420g was used. The bowl itself was about 193g and filled with approximately 230g of M&M's.

### After effects (snack intake)

The amount of M&M's consumed (snack intake) was also measured after the taste test in all three conditions. The bowl including the M&M's was weighed (in grams) before and after the taste test by the experimenter, with the participant not present.

### Hunger state after the manipulation

Hunger state was measured after the participants were exposed to the manipulation. This was measured with the question: '*How hungry are you at the moment?*' using a 5-point scale (1= not hungry at all and 5= very hungry).

### Liking after the manipulation

Participants had to indicate their liking for chocolate after the manipulation. This was measured using the question: '*How tasty or non-tasty do you find M&M's?*' on a 5-point scale (1= very non-tasty and 5= very tasty).

### Level of relaxation after the manipulation

The level of relaxation after the manipulation was measured to check whether the manipulation influenced the behaviour of the participants (emotional state). This was measured with the question: '*How relaxed do you feel at the moment?*' using a 5-point scale (1= not relaxed at all and 5= very relaxed).

### Desire after the manipulation

To measure how much desire participants had for chocolate after exposure of the manipulation, two questions were used '*How willing are you to eat M&M's at the moment?*' and '*How much would you like to eat M&M's at the moment?*' using a 5-point scale (1= not at all and 5= very much). Desire was computed into one mean score, Cronbach's  $\alpha = .919$ .

### True purpose of the experiment

At the end, participants were asked to guess the true purpose of the experiment (open-ended question on paper). Participants that answered "feeling free to grab", "taking M&M's whether or not", "not



eating M&M's", "weighing the bowl" or "presence of cues (plastic wrap or the sign)" were categorized with 'yes', others with 'no'.

## **Mediator variable**

### Psychological reactance

The scale of psychological reactance used in this study was inspired by Stok et al., (2015), including two items *It annoyed me that M&Ms were put in front of me that I was not supposed to eat from* and *Being suggested not to eat the M&Ms triggered a sense of resistance in me*, measured on a 5- point scale ranging from 1 (totally disagree) to 5 (totally agree) were used in the questionnaire after the creativity task (Appendix 1.5) A mean score for psychological reactance was computed (Cronbach's  $\alpha = .781$ ). Furthermore, the variables: desire, liking for chocolate, level of relaxation and the amount of M&M's consumed were also used to measure psychological reactance.

## **Control variables**

### Gender, age & education

The first questionnaire started with general open questions about gender (m/f) and age. Furthermore, education was measured using an open question: *'Do you follow an educational programme at Vakschool RijnIJsse?'* If the answer was yes, participants could write down the name of their education programme.

### Hunger state before the manipulation

Participants were asked to give an indication of their hunger state before the manipulation. This was measured with the question: *'How is your appetite at the moment?'* using a 5-point scale (1= very little appetite and 5= strong appetite).

### Level of relaxation before the manipulation

Before the manipulation, participants were asked to give an indication of their level of relaxation. To get insight in how people felt and if it differed with the score after the manipulation (emotional state). The question: *'Do you feel relaxed at the moment?'* using a 5-point scale (1= not relaxed at all and 5= very relaxed).

### Liking before the manipulation

Participants indicated their liking for chocolate at the beginning of the experiment on a 5-point scale (1=very non-tasty and 5= very tasty), with the question: *'How tasty or non-tasty do you find M&M's?'* To check whether participants liked to eat chocolate.

### Desire before the manipulation

To measure beforehand how much craving and willingness participants had for chocolate, the following questions were asked: *'How willing are you to eat M&M's at the moment?'* and *'How much would you like to eat M&M's at the moment?'* using a 5-point scale (1= not at all and 5= very much). Desire was computed into one mean score, Cronbach's  $\alpha = .920$ .

### **Moderator variables**

#### Need for autonomy

Participants' need for autonomy was measured on 5-point scale ranging from 1 (totally disagree) to 5 (totally agree) by the following two statements: *I try to follow the rules* and *I do what I want to do* (reverse coded), Cronbach's  $\alpha = .037$ . The internal consistency was unacceptable; thus, the two statements were both used as single variables.

#### Healthy eating goal

Participants were asked to indicate whether they had a healthy eating goal, using a 5-point scale (1 = totally disagree and 5 = totally agree). The statements about "healthy eating goal": *I am aware of how much sweets I eat* and *I try not to eat too many sweets* had a good internal consistency and were computed into one mean score (Cronbach's  $\alpha = .888$ ).

### **Manipulation check**

#### Social norm

Social norms were measured to check for the perception of norms in each condition. The second questionnaire included four questions about social norms. *'Did you feel free take some M&M's?'* using a 5-point scale (1= not free and 5= very free). *'Do you think it was normal to take some M&M's?'* using a 5-point scale (1= not normal at all and 5= very normal), *'Do you think it was the intention to take some M&M's?'* using a 5-point scale (1= not the intention at all and 5= definitely the intention), *'How appropriate or inappropriate did it feel to take some M&M's?'* using a 5-point scale (1= very inappropriate and 5= very appropriate). A mean score for social norm was computed (Cronbach's  $\alpha = .817$ ).

## **4.5 Data analysis**

The data were analysed by the statistical software program IBM SPSS Statistics 23. A significance level of  $p < .05$  was used in all analyses. First, randomization checks were conducted to check to what extent the control variables were randomized over the conditions. Those checks were performed using analysis of variance (ANOVAs). Except for gender, therefore a chi square test was conducted. Furthermore, a correlation analyses was conducted between the control variables and outcome variables using Pearson

correlations ( $r$ ) and Spearman's correlations ( $r_{sp}$ ). The outcomes of those checks were conducted to decide whether dependent variables must be corrected by control variables.

Before the hypotheses were tested, assumptions were checked. Normality checks (QQ-plots) and level of skewness and kurtosis were tested for consumption during the creativity task and consumption during the taste test, and more dependent variables (liking, desire, hunger state). When data was not normally distributed, the natural logarithm was used. Furthermore, homogeneity of variances (Levene's test) were checked. The independent variables were manipulated and the effect that this change had on dependent variables was examined to identify a relation and an effect between variables. Analysis (ANCOVAs) were completed with condition (physical cue, written text and control) as independent variable, consumption of M&M's (during creativity task/during taste test) as dependent variable and variables that correlated significantly with the dependent variables were used as covariates.

To examine the differences in behaviour before and after the manipulation, ANCOVAs (and repeated measures) were conducted for the variables, hunger state, liking, level of relaxation and desire. Psychological reactance was measured as dependent variable (ANCOVA) and as mediator variable by using a mediation analysis Hayes PROCESS tool (Hayes, 2013). To test what kind of moderated effect healthy eating goal had on psychological reactance and consumption of chocolates, MANCOVAs were used. A similar procedure was conducted for autonomous motivation.

## 5. Results

### 5.1 Descriptive statistics

The mean age of participants was 18 years ( $M=18.6$ ,  $SD = 2.0$ ). Most participants followed the educational programme 'entrepreneur bakery' (15%), "supervisor" (14%), 'chef' (12%) or "self-employed baker" (9%) (Appendix 3.3). Before the manipulation, participants were not hungry but also not satisfied ( $M= 2.8$ ,  $SD = 1.0$ ) and they reported a high score on liking for chocolate ( $M= 4.1$ ,  $SD= 0.8$ ). On average, participants had a high level of relaxation ( $M= 4.0$ ,  $SD= 0.8$ ) and their desire to eat chocolate was about the average score ( $M= 3.1$ ,  $SD =0.9$ ). Participants indicated healthy eating goal as important ( $M=3.4$ ,  $SD=1.1$ ). Furthermore, they scored high on both variables of need for autonomy ( $M=3.7$ ,  $SD=0.9$  and  $M=4.0$ ,  $SD=0.8$ ).

#### Randomisation check

In order to determine whether the randomisation of the participants between the conditions was, univariate ANOVAs were performed with condition as independent variable and for age, hunger state, level of relaxation, liking, desire, healthy eating goal and need for autonomy as dependent variables. The categorical variable gender was tested with a Pearson chi square test (Table 1). No differences were found between conditions for age, gender, level of relaxation, liking for chocolate, desire, healthy eating goal and need for autonomy (all  $p>.08$ ), except for hunger state. Hunger state was not equally divided across all conditions ( $p = .01$ ). Therefore, hunger state was included as covariate in the analyses.

#### Correlation table

A Pearson's correlation table (Pearson and Spearman) was run to assess the different relationships. Whether a causal link between those variables exists, will become clear in further analyses. Pearson correlations were conducted for all control and dependent variables, for the variable gender a Spearman's correlation was used. The table below (Table 2) shows the correlations. The bivariate Pearson Correlation produces a correlation coefficient,  $r$ , which measures the strength and direction of linear relationships between pairs (Laerd Statistics, 2018).

Correlations: A small correlation was found between gender and consumption during the creativity task. A link between hunger state after the manipulation and liking and desire before the manipulation was identified. As well as a correlation between liking after the manipulation and desire before the manipulation (medium). The variable psychological reactance correlates with liking and desire before the manipulation. Perceived social norms (manipulation) correlate with both variables measuring need for autonomy. The consumption during the taste test correlates with gender, hunger state before the manipulation, desire and liking before the manipulation. At last, consumption during the taste test relates to hunger state before the manipulation and liking before the manipulation. The control variables age, level of relaxation and healthy eating goal did not significantly correlate with any of the dependent variables. The strength of association was denoted by  $0.1 < |r| < .3$  = small correlation,  $0.3 < |r| < .5$  = medium/moderate correlation,  $|r| > .5$  = large/strong correlation.

### Manipulation check

A manipulation check was performed to check whether participants perceived the cue and text as a social norm. An ANCOVA test, with condition as independent variable, social norms as dependent variable and hunger state and need for autonomy as covariates showed a significant effect ( $F(2,144) = 13.11$ ,  $p < .001$ ,  $\eta p^2 = .154$ ). Post-hoc pairwise comparisons (Bonferroni) showed that participants in the control condition felt more free to take chocolates compared to participants in the physical cue or written text condition ( $M=2.8$ ,  $SD=0.99$ ,  $p < .001$ ). There was no significant difference between the physical cue condition or the written text condition ( $p=.92$ ).

Table 1. Randomization checks, manipulation check and overview outcomes

	Cue (N=49)		Written text (N=49)		Control (N=49)				
	M	SD	M	SD	M	SD	F	p	ηp2
<i>Randomisation checks</i>									
Age	18.59	2.00	18.20	2.02	18.96	2.12	1.68	0.19	0.02
Hunger state before manipulation*	3.06	0.99	2.47	0.96	2.82	0.91	4.79	0.01*	0.06
Relaxed before manipulation	3.96	0.79	4.10	0.62	3.78	0.92	2.13	0.12	0.03
Liking before Manipulation	4.10	0.68	4.04	0.84	4.29	0.76	1.36	0.26	0.02
Desire before manipulation	3.08	0.92	2.84	0.82	3.20	0.97	1.97	0.14	0.03
Healthy eating goal	3.18	1.06	3.57	1.01	3.37	1.08	1.67	0.19	0.02
Needforautonomy1	3.65	0.93	3.73	0.81	3.65	0.81	0.15	0.87	0.01
Needforautonomy2	3.96	0.84	3.67	0.92	3.98	0.89	1.85	0.91	0.05
Gender	59% ‘		37% ‘		45% ‘		X2=5.08	0.08	
<i>Manipulation check</i>									
Social norms*	2.15a	0.88	1.97a	0.68	2.81b	1.00	13.11	0.00*	0.15

The mean and standard deviations were recorded during the three conditions of injunctive norms. P-values arising from ANOVAs are presented. \* indicates a significant difference at  $p < .05$ . ` means percentage of males. The subscripts "a" are not significant, only the condition with "b".

Table 2. Correlation table

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Gender (sp)	-																
2. Age	-.143	-															
3. Hungerstate before manipulation	.020	.037	-														
4. Relaxed before manipulation	-.099	-.061	-.024	-													
5. Liking before manipulation	.192*	.099	.051	.126	-												
6. Desire before manipulation	.069	.026	.515**	-.011	.451**	-											
7. Healthy eating goal	-.084	-.019	-.043	-.041	-.080	-.098	-										
8. Need for autonomy 1	.139	.054	.040	-.036	.029	-.008	.306**	-									
9. Need for autonomy 2	.162*	.106	.039	-.020	.007	.066	.221**	-.019	-								
10. Hunger state after manipulation	.076	-.049	.744**	.005	.174*	.612**	-.096	.012	.073	-							
11. Relaxed after manipulation	-.141	-.088	.008	.719**	.125	.024	-.001	-.025	.040	.036	-						
12. Liking after manipulation	.154	.088	.054	.137	.861**	.455**	-.075	.041	.026	.192*	.217**	-					
13. Desire after manipulation	.094	.010	.452**	-.038	.396**	.828**	.015	.052	.138	.656**	.118	.444**	-				
14. Psychological reactance	.017	-.068	.143	-.002	.225**	.351**	.023	-.057	.093	.334**	.037	.219**	.445**	-			
15. Social norms	.084	.090	.094	-.102	.112	.069	-.129	-.162*	.165*	-.051	-.061	.103	.032	-.011	-		
16. Consumption creativity task	.167*	-.073	.272**	-.137	.171*	.280**	-.116	-.011	.017	.243**	-.057	.157	.279**	.027	.352**	-	
17. Consumption taste test	.060	.011	.290**	.031	.145	.309**	-.140	.078	-.048	.335**	.093	.163*	.298**	.204*	.105	.228**	-

## 5.2 Inferential statistics

Primary, the four variables, hunger state, liking for chocolate, level of relaxation and desire were tested to check whether differences exist before and after the manipulation. More in-depth results can be found in Appendix 3.3.

### Hunger state

Hunger state correlated with liking and desire before the manipulation, therefore the variables were used as covariates. Besides, consumption during the creativity task was used as covariate to correct for consumption, it could be that participants consumed more and therefore were less hungry after the manipulation. The ANCOVA was performed with condition as independent variable, hunger state as dependent variable and liking and desire before the manipulation as covariates. There was no significant interaction effect between hunger state and condition,  $F(2, 144) = 1.845$ ,  $p = .16$  partial  $\eta^2 = .036$ .

Also, an ANCOVA with hunger state after the manipulation as dependent variable, condition as independent variable and hunger state, liking and desire before the manipulation as covariates was performed. No significant effect was found,  $F(2, 143) = .730$ ,  $p = .484$ .

### Liking for chocolate

An ANCOVA was conducted with condition as independent variable and liking for chocolate (new variable; difference) as dependent variable, and liking and desire as covariates. There was no significant interaction effect between liking for chocolate and condition  $F(2, 142) = .997$ ,  $p = .372$  and partial  $\eta^2 = .014$ .

### Level of relaxation

An ANCOVA was conducted with condition as independent variable and level of relaxation (new variable; difference) as dependent variable, and hunger state as covariates. There was no significant interaction effect between level of relaxation and condition  $F(2, 143) = 2.231$ ,  $p = .111$  and partial  $\eta^2 = .030$ .

### Desire

An ANCOVA was conducted with condition as independent variable and desire (new variable; difference) as dependent variable, and hunger state as covariate. There was no significant interaction effect between desire and condition  $F(2, 141) = 2.230$ ,  $p = .111$  and partial  $\eta^2 = .031$ .



## Tests of hypothesis 1

The first hypothesis *'Injunctive norms communicated via text have less influence on (healthy) eating behaviour of Dutch consumers than injunctive norms communicated via cues'* is tested by analysing the immediate effect and the after effect of consumption.

### Consumption during creativity task (immediate effect on consumption)

Participants did not consume many chocolates (M&M's) during the creativity task (Figure 3). In total 13 participants took some chocolates. In the physical cue condition people consumed on average 2.9 grams (SD = 11.0, N=4), in the control condition 0.85 grams (SD =3.0, N=9) and in the written text condition no chocolates. The consumption of the participants during the creativity task was not normally distributed for each condition, as assessed by Shapiro Wilk's test ( $p < .00$ ). The assumption of homogeneity of variances, the Levene's test for equality of variances was  $p = .007$ . Given many participants who consumed nothing, the transformed data was not reliable. Therefore, the non-transformed collected data was used. An ANCOVA with condition as independent variable, consumption of chocolates (in grams) during the creativity task as dependent variable and hunger state, gender, liking for chocolate before the manipulation and desire before the manipulation (Table 3) as covariate was performed. As a result, no statistically difference was found between the amount of chocolates (in grams) consumed and the three conditions,  $F(2, 140) = 1.650$ ,  $p = .196$ , partial  $\eta^2 = .023$ . In addition, no significant difference between the injunctive norms and consumption during the creativity task,  $p > .05$ .

### Consumption during the taste test (after effect on consumption)

During the taste test, participants were free to consume as many chocolates as they liked. Descriptive statistics showed that participants consumed most chocolates in the physical cue condition ( $M = 7.5$ ,  $SD = 10.9$ ). In the written text condition participants consumed on average 5.26 grams of M&M's ( $SD = 6.1$ ) and in the control condition 5.51 grams of M&M's ( $SD = 5.8$ ). The data was not normally distributed (Skewness = 3.786 and Kurtosis = 21.377). After LOG transformation of the data, an ANCOVA with condition as independent variable, consumption during taste test as dependent variable and hunger state and desire as covariates was conducted. Overall, condition was not a significant predictor for consumption during the taste test,  $F(2, 143) = .132$ ,  $p = .877$  and partial  $\eta^2 = .002$ . There was no effect between condition and consumption during the taste test. An extra analysis was conducted excluding participants ( $N = 3$ ) not consuming any chocolates. However, no significant results were found.  $F(2, 139) = .882$ ,  $p = .416$  and partial  $\eta^2 = .013$ .

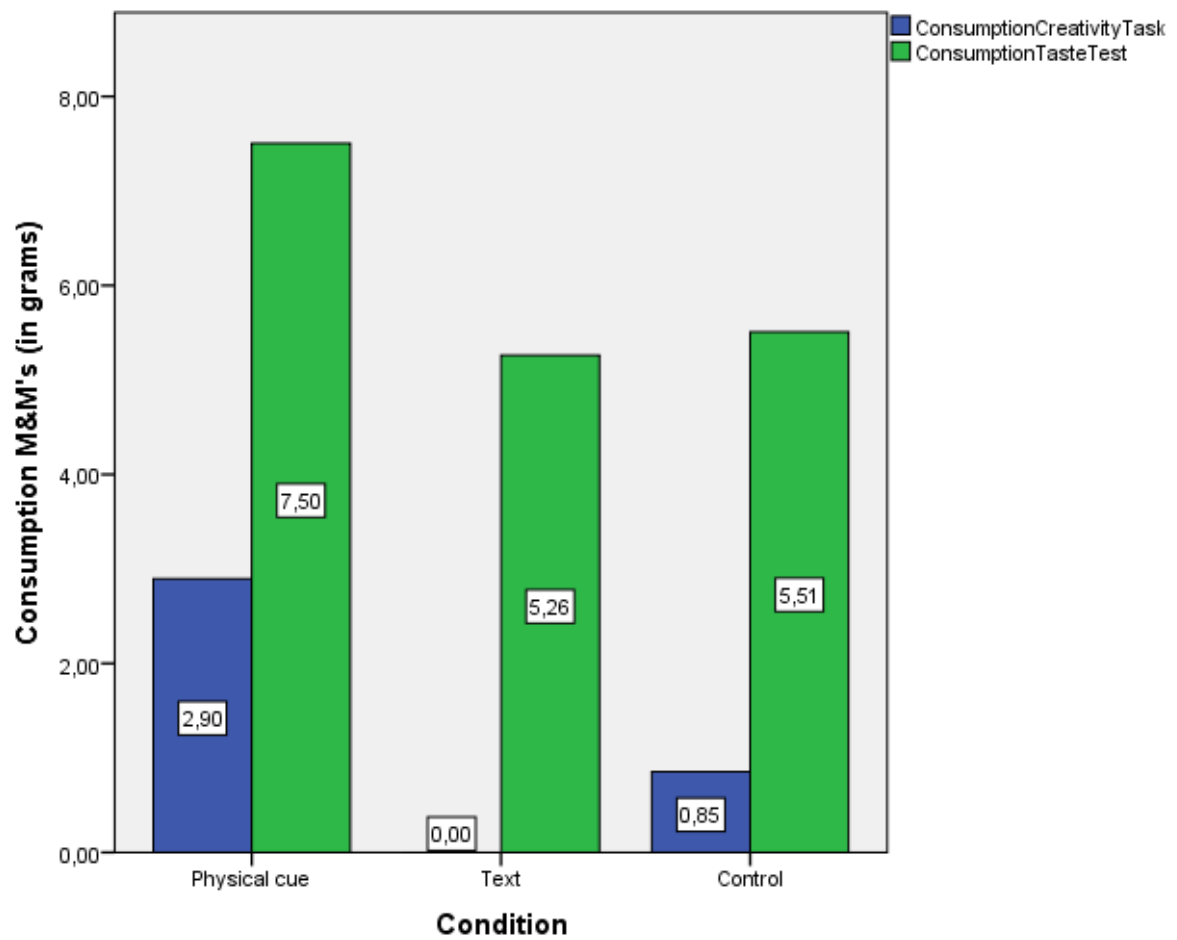


Figure 3. The average consumption of M&M's (in grams) during creativity task and taste test.

## Tests of hypothesis 2

The second hypothesis 'Injunctive norms communicated via text lead to more psychological reactance than injunctive norms communicated via cues in the environment' is tested with ANCOVA and a mediation analysis.

### Psychological reactance

To examine the second hypothesis, whether an injunctive norm communicated via text leads to more psychological reactance than an injunctive norm communicated via a cue, psychological reactance was measured. A positive correlation between psychological reactance and liking and desire ( $r = .23$  &  $r = .35$ ) was found. Participants who scored high on liking for chocolate and desire scored high on psychological reactance. An ANCOVA with condition as independent variable and psychological reactance as dependent variable, with hunger state, liking before the manipulation and desire before the manipulation as covariates was conducted. It was shown that psychological reactance was not statistically different across the three conditions,  $F(2,141) = .518$ ,  $p = .597$ , partial  $\eta^2 = .007$  ( $M = 1.7$ ,  $SD = 1.0$ ,  $M = 1.8$ ,  $SD = 1.1$ ,  $M = 1.8$ ,  $SD = 0.9$ ).

The effect of different conditions on psychological reactance was also assessed with the help of Hayes (Hayes, 2013). This is a mediation analysis used to determine whether a connection between condition and the amount of consumed M&M's (in grams) could be transferred via a third variable; psychological reactance. The Y was defined as consumption, X as condition and M as psychological reactance. A mediation analysis was conducted (Table 3). No relationships were demonstrated and mediation by psychological reactance did not occur.

Table 3. Mediation analysis (Hayes)

Hayes
1) X variable predicts y – path c a. $F(1,145) = 2.32$ , $p = .13$ , $R^2 = .02$ b. $b = -1.02$ , $t(145) = -1.52$ , $p = .13$
2) X variable predicts m – path a a. $F(1,145) = .521$ , $p = .47$ ( $> .05$ ), $R^2 = .00$ b. $b = .07$ , $t(145) = .72$ , $p = .47$
3) X and m together predicting y a. $F(2,144) = 1.24$ , $p = .29$ , $R^2 = .02$ - M variable predicts y- path b i. $b = .24$ , $t(144) = .42$ , $p = .67$ - X variable no longer predicts y or is lessened predicting y – path c' i. $b = -1.04$ , $t(144)$ , $p = .13$

To check whether second hypotheses could be accepted, not only psychological reactance itself was measured. Psychological reactance was also measured by consumption during the taste test

(consumption after the manipulation), liking for chocolate, desire and level of relaxation. The results of consumption during the taste were not significant as indicated before, idem for level of relaxation, liking for chocolate and desire. There was no significant difference demonstrated between condition and those variables. Hypothesis 2 received no support from the data, none of the injunctive norms lead to stronger psychological reactance.

### Tests of hypothesis 3 and 4

Finally, the third and fourth hypotheses: *'If Dutch consumers have a need for autonomy they will show more reactance on injunctive norms communicated via text and cues than when consumers score low on need for autonomy'* and *'If Dutch consumers have as goal to eat healthy they will show less reactance on injunctive norms communicated via text and cues than when consumers do not have a healthy goal'* are tested with MANCOVA's and regression analyses.

#### Healthy eating goal

This variable was tested to show whether healthy eating goal could be found to predict consumption of chocolates and psychological reactance. A MANCOVA with psychological reactance and consumption during the creativity task as dependent variables and healthy eating goal and condition as independent variables (and hunger state as covariate) was conducted. Means and standard deviations were very similar (see Table 1) and healthy eating goal showed a general trend to be almost equal in each condition. There was no statistically significant interaction effect between healthy eating goal and conditions on the combined dependent variables after controlling for hunger state,  $F(4, 240) = 1.629$ ,  $p = .167$ , Wilks'  $\Lambda = .948$ , partial  $\eta^2 = .026$ .

A linear regression analysis for healthy eating goal was performed. Psychological reactance was used as dependent variable and condition, healthy eating goal and healthy eating goal\*condition were used as independent variables. Healthy eating could not statistically significant predict psychological reactance,  $F(3, 143) = .526$ ,  $p = .665$ . About 1.1% could be explained by of healthy eating goal, no statistically effect was found.

#### Need for autonomy

Need for autonomy was measured similar to healthy eating goal. A MANCOVA was conducted with psychological reactance and consumption during creativity task as dependent variables and both variables of need for autonomy and condition as independent variables (and hunger state as covariate). There was no statistically significant difference between both variables need for autonomy and conditions on the combined dependent variables after controlling for hunger state, respectively  $F(4, 278) = .532$ ,  $p = .712$ , Wilks'  $\Lambda = .985$ , partial  $\eta^2 = .008$  and  $F(4, 278) = .130$ ,  $p = .971$ , Wilks'  $\Lambda = .996$ , partial  $\eta^2 = .002$ .

Furthermore, a linear regression analysis was conducted for need for autonomy, using psychological reactance as dependent variable and need for autonomy, condition as independent variables. Need for autonomy could not statistically significant predict psychological reactance,  $F(3, 143) = .739$ ,  $p = .531$ . About 1.5% could be explained by need for autonomy, no statistically effect was found.

These significant negative results show that in all situations need for autonomy and healthy eating goals cannot be applied as moderators.

## 6. Discussion

This study investigated the role of injunctive norms communicated via written text and injunctive norms communicated via a cue on eating behaviour. Additionally, we examined whether psychological reactance mediated the effect of injunctive norms on eating behaviour. Finally, it was examined whether need for autonomy and healthy eating goals moderated the effect of injunctive norms.

For the study, an experiment was designed where participants had to accomplish a creativity task and taste chocolates, while exposed to injunctive norms communicated via a cue or via written text. Both cue and text condition included information of social norm behaviour.

### *Injunctive norms (text versus cue)*

The results showed that the physical cue and text were both perceived as a social norm discouraging eating behaviour. Participants who were exposed to the chocolates with a norm communicated by a physical cue or written text, felt less free to take chocolates in comparison with participants who were exposed to the chocolates without an injunctive norm. The communication of both injunctive norms was experienced as normative. However, this study did not demonstrate other significant effects for injunctive norms (difference between cue and written text), psychological reactance, autonomous motivation and healthy eating goal. In contrast to expectations, no significant differences were found between the various ways of communicating an injunctive norm and the effect of psychological reactance of participants. Most studies used social norms communicated via (written) text (Stok et al., 2014; Robinson, Fleming & Higgs, 2014; Zandstra, Carvalho & Van Herpen, 2017) but social norms can also be communicated via cues (Burger et al., 2010; Prinsen, de Ridder & de Vet, 2013). Injunctive norms communicated via cues need further investigations, as well as the best way how to communicate injunctive norms (Stok et al., 2014, Zandstra, Carvalho & Van Herpen, 2017; Raghoobar, Van Kleef, de Vet, in preparation). The way of communicating norms is crucial. The way of communicating injunctive norms in this experiment was in a lab-setting and could have influenced the results.

### *Psychological reactance*

In comparison to a descriptive norm, the injunctive norm is associated with psychological reactance. Injunctive norms contain a kind of power about what people should do. Therefore, psychological reactance can occur (Steindl et al., 2015). It was expected that the injunctive norms lead to backfire behaviour because participants could not feel free to consume. In this study, the effect of injunctive norms did not significantly impact the mediated effect of psychological reactance or indirectly the consumption during the taste test. The effect of psychological reactance was also measured by hunger state, liking for chocolate and desire for chocolate but no relations were found. Furthermore, Shen (2015) showed that when offering choices psychological reactance is lower in comparison to one choice. Possibly, participants did not feel threatened because the injunctive norms were not powerful enough, or the creative task was too challenging. The teachers of Vakschool RijnIJssel assured that the creativity task fitted very well in their educational program. Therefore, participants were especially focused on this task.

### *Autonomous motivation and healthy eating goal*

According to Ryan & Deci (2000) when considering behaviour change, the focus should be more on motivation. This study demonstrates that autonomous motivation is not a predictor for behaviour change because of different consumption patterns or expressing psychological reactance. It was expected that participants who had a higher need for autonomy showed more psychological reactance on both injunctive norms. Next to need for autonomy, healthy eating goal was measured as a moderator. Findings showed that having a healthy eating goal did not have an effect on consumption during the creativity task. Students did not show more reactance or reacted different on the injunctive norms. When the communicated injunctive norm is in line with someone's personal healthy eating goals, it can be expected that there will be less psychological reactance than in an incongruent situation. Possibly, participants did not use their common sense or maybe they felt pressure to behave specifically. Participants were relatively young and this group usually has a high need for autonomy (MBO Raad, 2017). The large number of participants should at least partly reduce the effect in this study.

An explanation for no significant results could be: less chocolate consumption during the creativity task by the participants. Results indicate that the injunctive norms did not significantly change the consumption during the creativity task. Only 14 of 147 participants consumed chocolates during the creativity task. Maybe the creativity task was too difficult, too much emphasis on time (seven minutes) or the injunctive norms were not effective enough as mentioned in the previous paragraph. This was all due to the lab-setting. In general participants did not feel free to take chocolates. All participants consumed less M&M's than expected during the taste test.

## 6.1 Strengths and limitations

In this study, injunctive norms appeared to be powerful. Participants perceived the injunctive norms as social norms, and the norms discouraged eating behaviour. Injunctive norms can be used in society as insight to prevent overweight. It could be a challenging instrument for schools to use those norms and help children to avoid unhealthy eating behaviour. The government has to realise that they can apply the power of injunctive norms to maintain people's weight. It is a way to encourage people to eat (more) healthily and it definitely has the power to be a solution for the problem of overweight.

Stok et al., (2015) have shown that the suggestive rule works better than the restrictive rule. This study shows that the injunctive norm communicated via written text is even a better option than formulating it in a restrictive way. Furthermore, we wanted to investigate in physical cues (instead of text) in the eating environment to research more options instead of suggesting way of formulating. We expected that a cue works more subtle and therefore generates less psychological reactance. This study did not find significant results. It could be that the cue was too obvious and did not create an effect in a designed experiment instead of a real-life situation.

A limitation of this study could be the generalizability. The participants were all *MBO* students aged between 16-27. Students in secondary vocational education (*MBO*) are different from other students because of the diversity of the *MBO* program itself, the requirements and their preliminary education.

MBO students differ more in age and background in comparison with pupils of HAVO or VWO (MBO Raad, 2017). It could explain why the results were different than expected. In future research, diverse groups exposed to injunctive norms need to be researched. Also, older people must be included.

Another limitation could be: measuring autonomous motivation and healthy eating goal. Autonomous motivation is of great importance during (health) decision making according to literature (Teixeira et al., 2011; Smit et al., 2017). Literature about VMBO students shows that those students have a high need for autonomy. Therefore, they have the freedom to perform an activity at its discretion (Van der Veen et al., 2014). Healthy eating goal and need for autonomy were measured with two items only. The students were not familiar with filling in questionnaires, therefore it was more easy for them to indicate their score using a 5-point scale instead of 7-point scale. Besides, most scales and items used were validated (used in comparable previous studies). More items measuring healthy eating goal and need for autonomy need to be included to improve the outcome of injunctive norms and behaviour change in future studies.

Even though the experimenter told the participants to consume as much as they wanted, participants behaved socially desirable: not to grab the bowl. It could be that according to them, it was not decent to eat much, or even the whole bowl of M&M's. Participants consumed considerably less chocolates than expected.

Besides, social pressure and less concentration may have interfered. For example, when students finished the creativity task, they took their mobile phone and waited for further instructions. Even some participants maybe not fond of M&M's, students were persuaded by their friends to participate in the experiment. Students were more willing to participate after contacting a former student.

At last, a limitation of this study could be the salience of the injunctive norms. For example, in the experiment was not measured whether students have noticed the injunctive norms. Be aware of the norm is of great importance because the norm that gets most attention will be followed (Cialdini et al., 1990; Burger et al., 2010; Jacobsen, Mortensen & Cialdini, 2011; Higgs & Thomas, 2016).

## 6.2 Suggestions for future research

For many people, it is not easy to eat healthy. With the help of social norms, it could be easier for people to adjust their behaviour. Social norms create guidelines for behaviour and steer people how to behave. Although norms can differ in contexts or are dependent on religion, culture, age etcetera, social norms can have an impact on behaviour. It is important to examine the (different) effects of norms separately, because "what is done" (descriptive) and "what ought to be done" (injunctive) are closely related. Usually, what is typically done is approved and therefore it is easy to mix up descriptive norms and injunctive norms (Cialdini et al., 1990). Applying injunctive norms needs to be further investigated, because most research covers descriptive norms.

In future research, healthy eating over a longer period or after effects of social injunctive norms could be measured. Maybe results will differ if "after effects" are included. Do injunctive norms have a long-



term effect? Are there differences in measuring the effect of injunctive norms at one time or after a longer period? A study by Schultz et al., (2007) showed that social norms still have effect after four weeks. When the after effects can be included or the communication of an injunctive norm would be extended, results can be different?

As indicated before, research needs to be conducted by a different group or context to encounter other differences. As well as the attention that people have for injunctive norms needs to be further investigated. It could be when people do not notice the norm, the norm will not work.

### 6.3. Conclusion

In conclusion, this study showed that injunctive norms are perceived as social norms, indicating that participants felt less free to take chocolates when exposed to the injunctive norms communicated via text or via a cue, compared to participants without communication of an injunctive norm. In contrast to expectations, psychological reactance did not mediate the relation between injunctive norms and consumption. Also, the variables 'need for autonomy' and 'healthy eating goal' need to be further examined. Future studies should consider the way how to communicate injunctive norms, the attention of injunctive norms and the long-term effects. It could be an interesting strategy to stimulate healthy eating behavior or maintain healthy weight. Integrating injunctive norms in real- life could help to resist the temptation of unhealthy food. Injunctive norms are powerful for a healthy society.

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## Appendices

### Appendix A: Experiment

#### 1.1 Script

##### **STAGE 1 – Toestemmingsverklaring en Vragenlijst 1**

De onderzoeker verwelkomt de participant en begeleidt hem of haar naar de ruimte waar het experiment plaatsvindt. De participant neemt plaats aan een tafel.

*“Hoi! Leuk dat je mee wilt doen aan dit onderzoek, het onderzoek zal maximaal twintig minuutjes duren. Ik zal me even voorstellen, mijn naam is {naam} en wij doen onderzoek naar de invloed van creativiteit op smaak. Als eerste zou ik je willen vragen om deze toestemmingsverklaring voor het gebruik van je gegevens te lezen en te ondertekenen (participant leest en tekent de verklaring). Dankjewel, dan wil ik je vragen om deze korte vragenlijst in te vullen. Het invullen van de vragenlijst duurt ongeveer 3 minuutjes. Zou je het nummer wat op de post-it staat in kunnen vullen. Je antwoorden blijven volledig anoniem en er zijn geen goede of foute antwoorden. Wil je het belletje rinkelen als je klaar bent met het beantwoorden van de vragen? (De onderzoeker reikt vragenlijst 1 aan op de tablet. De onderzoeker loopt weg en wacht tot het belletje gaat.)*

##### Toestemmingsverklaring (Appendix 1.2).

Hierin staat onder andere de vraag of participanten toestemming geven om hun resultaten te laten gebruiken voor wetenschappelijk onderzoek. En dat de participanten vrij zijn iedere moment te stoppen als ze dat willen.

##### Vragenlijst 1 (Appendix 1.3)

Deze vragenlijst staat vol met vragen over: leeftijd, geslacht, studie, *healthy eating goal*, *hunger state*, *desire* en *overall-liking for chocolate*. Daarnaast aangevuld met filler items.

##### **STAGE 2 – Creatieve opdracht**

Als de participant klaar is met het invullen van de vragenlijst (note: onderzoeker checkt altijd of de vragenlijst ook verzonden is op het tablet), moet de participant plaatsnemen aan de andere kant van de scheidingswand. Hier staat ook een tafel en daarop staat een schaalje met M&M's op een juiste afstand (met folie (conditie 1), zonder folie en met een bordje met tekst (conditie 2), en zonder folie en zonder bordje met tekst (conditie 3)). Het bakje met M&M's wordt een armlengte in de linkerhoek van de tafel gezet. De creatieve opdracht en het schaalje met M&M's zijn al voordat de participant binnen komt klaargezet aan de andere kant van de scheidingswand, die tafel kan je niet zien als je binnenkomt. De onderzoeker zegt:

*“Bedankt voor het invullen van de vragenlijst. Het onderzoek gaat dus over de invloed van creativiteit op smaak. Daarom bestaat het experiment uit twee onderdelen: een creatieve opdracht en een smaaktest. We beginnen met de creatieve opdracht. Ik wil je uitnodigen om aan de andere kant van de scheidingswand plaats te nemen om de creatieve opdracht te maken (onderzoeker wijst naar de tafel waar de creatieve opdracht klaarligt en participant neemt plaats). De opdracht bestaat uit het opschrijven van zoveel mogelijk ideeën voor een nieuwe bakkerij of restaurant. Extra uitleg over de opdracht staat op het formulier dat voor je neus ligt (deze opdracht wordt uitgevoerd op papier). Je hebt 7 minuten de tijd voor de creatieve opdracht. Probeer zo ver mogelijk te komen. Dan kom ik terug en krijg je uitleg over de smaaktest. Succes!*

##### Creatieve opdracht (Appendix 1.4)

Op dit A4tje staat de creatieve opdracht nogmaals uitgelegd en is aangevuld met vragen: Verzin zoveel mogelijk ideeën voor een nieuwe bakkerij of restaurant.

Drie condities:

- Conditie 1: schaalje M&M's met folie
- Conditie 2: schaalje M&M's zonder folie en met de tekst: *Je kunt beter niet van de M&M's eten tijdens de creatieve opdracht.*
- Conditie 3: schaalje M&M's zonder folie en zonder tekst

In elke conditie doet en zegt de onderzoeker hetzelfde. De onderzoeker zorgt dat de juiste conditie (1 van de 3) klaar staat. Zie randomisatie lijst (Appendix 2.4).

### **STAGE 3 – Vragenlijst 2**

Als de 7 minuten om zijn verteld de onderzoeker dat we bijna bij het tweede deel van de test zijn aangekomen. De onderzoeker vraagt of de deelnemer een korte vragenlijst in wilt vullen aan de andere kant van de scheidingswand en legt uit dat het schaalte met M&M's nog niet vol genoeg is en deze dat wel moet zijn omdat participanten straks moeten gaan proeven:

*“Dankjewel, de 7 minuten zijn voorbij, ik neem de creatieve opdracht mee. We zijn bijna aangekomen bij het tweede gedeelte van de test. Voordat je de smaak van de M&M's gaat beoordelen wil ik je vragen om aan de andere kant van de scheidingswand een korte vragenlijst in te vullen. Zou je het nummer wat op de post-it staat weer in kunnen vullen. Ondertussen vul ik het schaalte nog even iets meer aan voordat je zo gaat proeven. Als je klaar bent met het invullen van de vragenlijst kun je weer op het belletje drukken. De deelnemer neemt plaats en de onderzoeker reikt vragenlijst 2 aan.*

#### Vragenlijst 2 (Appendix 1.5)

In deze vragenlijst worden sommige vragen uit vragenlijst 1 herhaald. Daarnaast vragen die duiden op *psychological reactance*, *social norms* vragen en *filler items*.

### **STAGE 4 – Smaaktest**

Als de participant klaar is met het invullen van de tweede vragenlijst (note: onderzoeker checkt altijd of de vragenlijst ook verzonden is op het tablet), nodigt de onderzoeker de deelnemer weer uit om plaats te nemen aan de andere kant van de scheidingswand waar de smaaktest ondertussen klaarligt:

*“Bedankt voor het invullen van de vragenlijst. De smaaktest ligt klaar aan de andere kant van de scheidingswand, dit is het laatste onderdeel (deelnemer loopt naar de andere kant). Nu mag je de M&M's gaan proeven, je mag zoveel M&M's proeven als je zelf wilt. Ik wil je vragen om tijdens het proeven een aantal vragen in te vullen over de smaak van de M&M's omdat we het recept vernieuwd hebben. Je hebt 5 minuten de tijd voor de smaaktest. Neem de tijd, ik kom over 5 minuten bij je terug! Succes!”*

#### Smaak test (Appendix 1.6)

### **STAGE 5 – Afsluiting**

Na 5 minuten komt de onderzoeker terug en neemt de smaaktest en het bakje met M&M's mee. Vervolgens wordt de participant gevraagd om twee losse vragen in te vullen op papier aan de tafel waar de participant ook de vragenlijsten op de tablets heeft ingevuld en houdt de onderzoeker in de gaten wanneer de participant klaar is (Appendix 1.7). De twee afsluitende vragen zijn: Wat denk je dat het doel was van dit onderzoek? & Ben je allergisch of heb je een intolerantie voor bepaalde voedingsmiddelen?

*“Bedankt, dit was de smaaktest. Ik neem nu alles mee en wil je vragen om twee afsluitende vragen in te vullen over eventuele allergieën.*

Als de participant klaar is legt de onderzoeker uit dat het experiment is afgelopen. De participant wordt hartelijk bedankt en ontvangt een VVV bon ter waarde van 5 euro. Dit gebeurt bij de tafel bij de deur.

*“Dit waren de laatste vragen. Hartelijk dank voor het meedoen aan dit experiment. Wil je je naam noteren en je handtekening zetten op dit formulier als bewijs dat je de VVV bon in ontvangst hebt genomen? Schrijf ook je e-mailadres op als je over drie weken meer informatie wilt ontvangen over het doel en de achtergrond van de studie.”*

De participanten zetten hun handtekening op een papier en kunnen als ze willen hun emailadres achterlaten. Deze handtekening is vooral voor de VVV bon.

Added after the pilot study:

- “Er zijn geen goede of foute antwoorden.”
- “Neem de tijd, ik kom over 5 minuten bij je terug!”
- Using (.....) as reference weight; M&M's (in grams)

## Benodigdheden

- Ruimte (het liefst 2 lokalen/hokjes naast elkaar)
- Weegschaal
- Schaaltjes (waar de M&M's in kunnen)
- Doorzichtige folie - vershoudfolie
- M&M's, zie plaatje hieronder (melkchocolade)
- Tablet (s)!
- Belletje
- Stopwatch/mobiel
- Scheidingswanden (lebo kelder)
- Kleurpotloden (stiften)
- Puntenslijper
- Post its
- Paper clips
- Map
- .....

Toestemmingsverklaring (op papier- 160x)

Vragenlijst 1 (tablet)

De creatieve opdracht (op papier- 160x)

Vragenlijst 2 (tablet)

Smaaktest (op papier- 160 x)

Laatste losse vragen (op papier-160x)

Tekening voor ontvangst (per dag)

Intekenlijst (per dag)

Observatie formulier (op papier-160x)

Posters & Flyers

Vragenlijst 1 en de creatieve opdracht worden los van elkaar gegeven zodat in alle drie de condities vragenlijst 1 neutraal gevraagd kan worden. Alle vragen zullen worden beantwoord met een 5-punts schaal (ookwel de meest voorkomende schaal). Ten opzichte van een 7-punts likertschaal is een 5-punts schaal voor de participant makkelijker te begrijpen.



Figure 1. M&M's (source: own depiction)

## 1.2 Informed consent

### **Toestemmingsverklaring voor gebruik gegevens ten behoeve van het onderzoek**

#### ***Creativiteit & Smaak Experiment – 26 maart t/m 20 april 2018***

Hierbij verleen ik toestemming aan de verantwoordelijke onderzoekers van Wageningen University & Research om deel te nemen aan het onderzoek en de informatie die ik tijdens het experiment heb gegeven te gebruiken voor onderzoek. Dit onderzoek heeft als doel om inzicht te krijgen in de invloed van creativiteit op smaak. Het onderzoek wordt gefinancierd door NWO.

Mijn gegevens zullen alleen gebruikt worden voor het onderzoek en dit zal volledig geanonimiseerd gebeuren.

Ik weet dat meedoen aan het onderzoek helemaal vrijwillig is. Ik weet dat ik op ieder moment kan beslissen om toch niet mee te doen. Daarvoor hoef ik geen reden op te geven.

Voor meer informatie over dit onderzoek, kan ik contact opnemen met Rosanne Erasmus: 06-17749112 of [rosanne.erasmus@wur.nl](mailto:rosanne.erasmus@wur.nl)

Naam:.....

Datum:.....

Handtekening deelnemer:





### 1.3 Questionnaire 1

Beste deelnemer,

Bedankt dat je deze vragenlijst in wilt vullen. Je antwoorden blijven volledig anoniem en er zijn geen goede of foute antwoorden.

1. Wat is je geslacht?

- ☐ Vrouw
- ☐ Man

2. Wat is je leeftijd?

.....

3. Studeer of werk je aan de Vakschool Wageningen?

Studeren, namelijk de opleiding:.....

Werken .....

Anders:.....

4. Hoeveel *trek* heb je op dit moment?

Schaal 1-5 (helemaal geen trek - heel veel trek)

5. Hoe *relaxed* voel je je op dit moment?

Schaal 1-5 (helemaal niet relaxed - heel erg relaxed)

6. Hoe lekker of vies vind je M&M's?

Schaal 1-5 (heel erg vies - heel erg lekker)

7. Hoe graag wil je M&M's eten op dit moment (

Schaal 1-5 (helemaal niet graag – heel erg graag)

8. Hoeveel zin heb je om M&M's te eten op dit moment?

Schaal 1-5 (helemaal geen zin - heel veel zin)

9. In mijn dagelijkse leven streef ik ernaar:

Schaal 1-5: (helemaal mee oneens - helemaal mee eens)

Genoeg te sporten.....

Op mijn uitgaven te letten.....

Er op te letten hoeveel ik snoep.....

Op tijd naar bed te gaan.....

Niet te veel te snoepen.....

Mij aan de regels te houden.....

Te doen wat ik zelf wil.....

Sociale contacten te onderhouden.....

Hartelijk dank voor het invullen van deze vragenlijst!

Als je op het belletje drukt komt de onderzoeker bij je.

PARTICIPANT:

DATUM:

TIJD: --> online & post-it

## 1.4 Creativity task

Verzin aan de hand van de vragen zoveel mogelijk ideeën voor een nieuwe bakkerij of een nieuw restaurant. Wees zo creatief als je zelf wilt! Je mag de kleurpotloden die op tafel liggen gebruiken.

Kies één van de onderstaande opties:

- ☐ Bakkerij
- ☐ Restaurant

Vraag 1: Beschrijf jouw nieuwe bakkerij of restaurant.

Vraag 2: Bedenk minimaal twee passende namen voor jouw nieuwe bakkerij of restaurant.

Vraag 3: Teken een logo die hierbij past.

Vraag 4: Beschrijf minimaal drie producten of drie gerechten die verkrijgbaar zijn in jouw nieuwe bakkerij of restaurant.

Vraag 5: Beschrijf de locatie van jouw nieuwe bakkerij of restaurant.

PARTICIPANT:      DATUM:      TIJD:

## 1.5 Questionnaire 2

1. Hoeveel *trek* heb je op dit moment?

Schaal 1-5 (helemaal geen trek - heel veel trek)

2. Hoe *relaxed* voel je je op dit moment?

Schaal 1-5 (helemaal niet relaxed - heel erg relaxed)

3. Hoe graag wil je M&M's eten op dit moment

Schaal 1-5 (helemaal niet graag – heel erg graag)

4. Hoeveel zin heb je om M&M's te eten op dit moment?

Schaal 1-5 (helemaal geen zin - heel veel zin)

5. Hoe lekker of vies vind je M&M's?

Schaal 1-5 (heel erg vies - heel erg lekker)

6. Geef bij de volgende stellingen aan in hoeverre je het ermee eens bent

(1 = helemaal mee oneens en 5= helemaal mee eens)

Ik vond het leuk om aan de creatieve opdracht te werken

Ik was geïrriteerd dat ik verleid werd om te eten, maar dat het niet de bedoeling was om te eten

Ik denk dat ik goede ideeën heb verzonnen bij de creatieve opdracht

Het was duidelijk voor mij dat ik geen M&M's mocht eten

Het irriteerde me dat er M&M's voor me werden neergezet waarvan ik niet hoorde te eten

Omdat ik zoveel trek had, was ik minder creatief dan ik normaal ben

Als het niet voor een experiment was, had ik graag van de M&M's gegeten

7. Voelde je je wel of niet vrij om M&M's te pakken?

Schaal 1-5 (helemaal niet vrij – heel erg vrij)

8. Hoe normaal vond je het om M&M's te pakken?

Schaal 1-5 (helemaal niet normaal - heel erg normaal)

9. Leek het je wel of niet de bedoeling om M&M's te pakken?

Schaal 1-5 (helemaal niet de bedoeling - heel erg de bedoeling)

10. Hoe gepast of ongepast voelde het om M&M's te pakken?

Schaal 1-5 (heel erg ongepast - heel erg gepast)

PARTICIPANT:      DATUM:      TIJD:

### 1.6 Taste test

Er is een nieuw recept voor M&M's ontwikkeld. We zijn benieuwd naar jouw beoordeling van de smaak van de M&M's. Je mag zo veel M&M's proeven als jezelf wilt. Zet een kruisje bij het juiste antwoord.

1. Hoe lekker of vies vind jij de M&M's eruitzien?

Schaal 1-5 (heel erg vies – heel erg lekker)

2. Hoe lekker of vies vind jij de geur van de M&M's?

Schaal 1-5 (heel erg vies- heel erg lekker)

3. Wat vind je van de kleur van de M&M's?

Schaal 1-5 (helemaal niet mooi - heel erg mooi)

4. Welke kleur M&M's vind je het aantrekkelijkst eruit zien? (Meerdere opties mogelijk)

- ☐ Groen
- ☐ Rood
- ☐ Oranje
- ☐ Geel
- ☐ Bruin
- ☐ Blauw

5. Hoe lekker of vies vind jij de smaak van de M&M's?

Schaal 1-5 (heel erg vies - heel erg lekker)

6. Wat vind je van de zoetheid van de M&M's?

Schaal 1-5 (helemaal niet zoet - heel erg zoet)

7. Wat vind je van de knapperigheid van de M&M's?

Schaal 1-5 (helemaal niet knapperig - heel erg knapperig)

8. Wat vind je van de grootte van de M&M's?

Schaal 1-5 (helemaal niet groot – heel erg groot)

9. Hoe lekker of vies vind je de nasmaak van de M&M's?

Schaal 1-5 (heel erg vies – heel erg lekker)

10. Zou je deze M&M's kopen in de winkel?

- ☐ Ja
- ☐ Nee

PARTICIPANT:      DATUM:      TIJD:

## 1.7 Final questions

1. Wat denk je dat het doel was van dit onderzoek?

.....

.....

.....

.....

.....

2. Ben je allergisch of heb je een intolerantie voor bepaalde voedingsmiddelen?

- ☐ Nee
- ☐ Ja, namelijk .....

Hartelijk dank voor je tijd en voor het meedoen aan dit onderzoek!

PARTICIPANT:      DATUM:      TIJD:

**Wageningen Universiteit doet onderzoek naar  
CREATIVITEIT & SMAAK!**



**MAXIMAAL  
20  
MINUUTJES**

**1 student  
per keer**

**DEELNEMERS  
GEZOCHT**

**CHOCOLADE LIEFHEBBERS OPGELET!**

**Wij doen onderzoek naar de invloed van creativiteit op de smaak van M&M's (vernieuwd recept) en willen graag weten wat jij ervan vindt!**

**WIE? Studenten (ouder dan 16 jaar).**

**WAAR? In lokaal VIT4 (in de kantine, de trap op) van de Vakschool Wageningen.**

**WANNEER? Van 28 maart 2018 t/m 13 april 2018.  
Elke werkdag van 09:00 tot 17:00 uur.**

**BELONING? Jazeker, een VVV bon ter waarde van 5 euro!**

**AFSPRAAK MAKEN? Schrijf je in op de intekenlijst bij lokaal VIT4 of mail naar [rosanne.erasmus@wur.nl](mailto:rosanne.erasmus@wur.nl)**



2.1 Proof of receipt

**Creativiteit & Smaak Experiment – Vakschool Wageningen X-X-X**

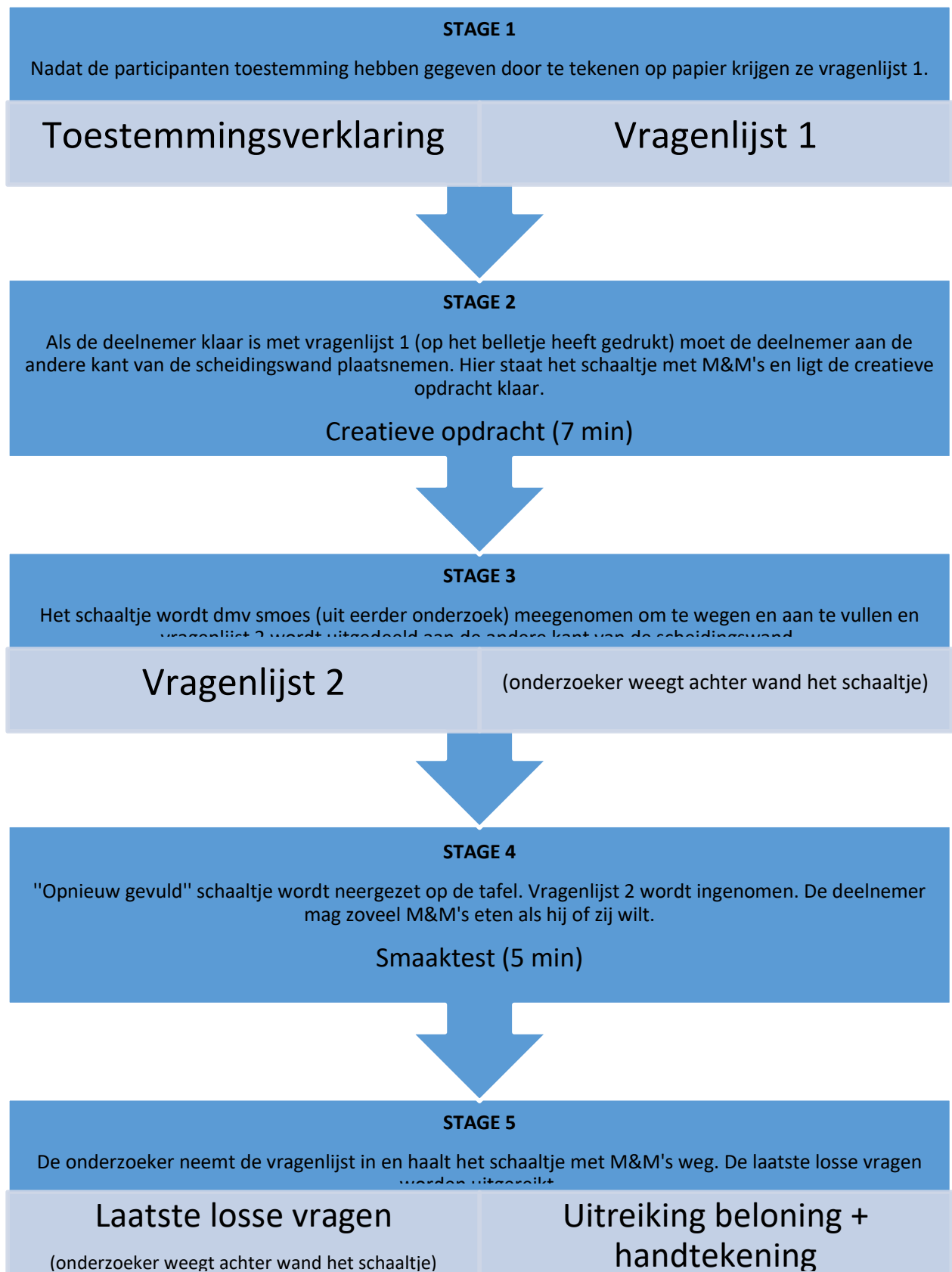
Naam	E-mail	Handtekening voor ontvangst VVV bon t.w.v. €5,-

## INTEKENFORMULIER - X- X- 2018

Tijdstip	Naam	E-mail adres
09:00 uur		
09:30 uur		
10:00 uur		
10:30 uur		
11:00 uur		
11:30 uur		
12:00 uur		
12:30 uur		
13:00 uur		
13:30 uur		
14:00 uur		
14:30 uur		
15:00 uur		
15:30 uur		
16:00 uur		
16:30 uur		



## 2.3 Schematic overview experiment



## 2.4 Randomisation

<b>Deelnemer</b>	<b>Conditie</b>
Deelnemer 1	3
Deelnemer 2	3
Deelnemer 3	1
Deelnemer 4	2
Deelnemer 5	2
Deelnemer 6	2
Deelnemer 7	3
Deelnemer 8	3
Deelnemer 9	3
Deelnemer 10	2
Deelnemer 11	3
Deelnemer 12	2
Deelnemer 13	3
Deelnemer 14	2
Deelnemer 15	2
Deelnemer 16	1
Deelnemer 17	1
Deelnemer 18	3
Deelnemer 19	2
Deelnemer 20	1
Deelnemer 21	1
Deelnemer 22	3
Deelnemer 23	1
Deelnemer 24	2
Deelnemer 25	3
Deelnemer 26	3
Deelnemer 27	1
Deelnemer 28	1
Deelnemer 29	2
Deelnemer 30	3
Deelnemer 31	3
Deelnemer 32	3
Deelnemer 33	2
Deelnemer 34	2
Deelnemer 35	3
Deelnemer 36	2
Deelnemer 37	2
Deelnemer 38	3
Deelnemer 39	1
Deelnemer 40	1

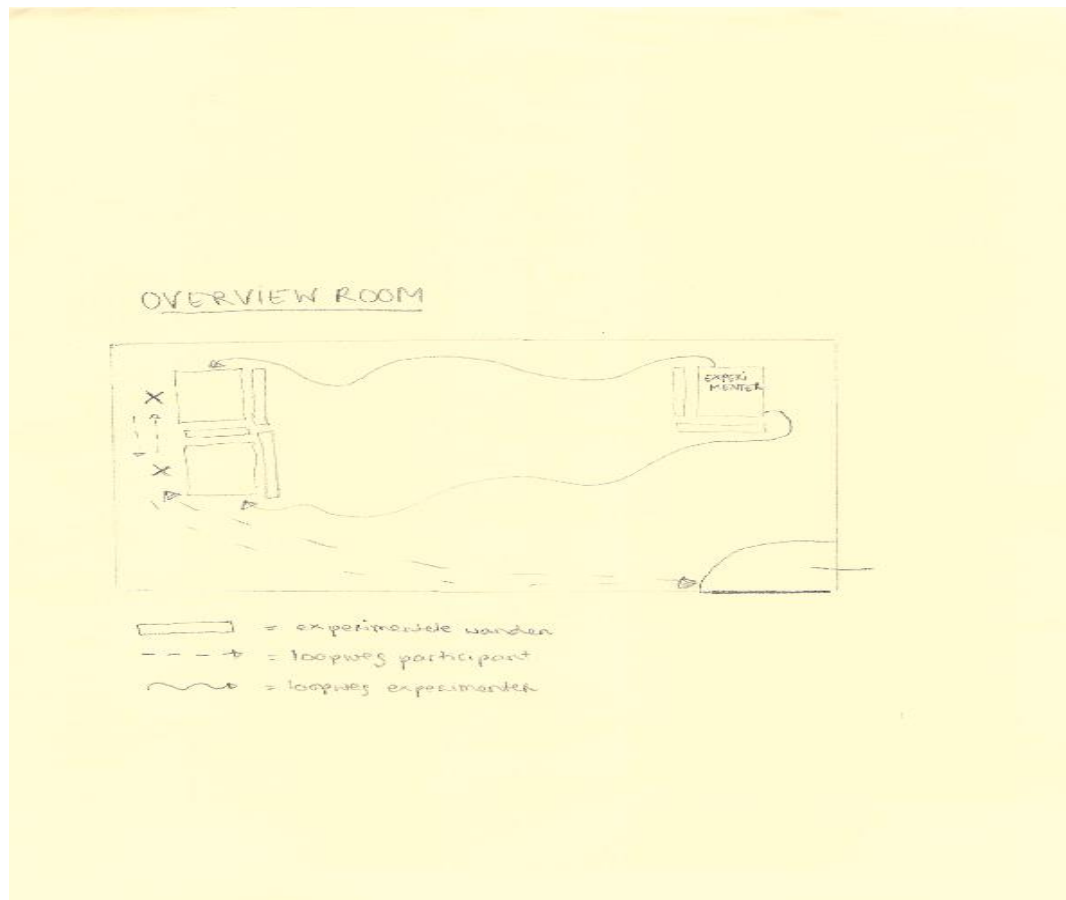
Deelnemer 41	3
Deelnemer 42	3
Deelnemer 43	2
Deelnemer 44	1
Deelnemer 45	2
Deelnemer 46	3
Deelnemer 47	2
Deelnemer 48	1
Deelnemer 49	2
Deelnemer 50	3
Deelnemer 51	3
Deelnemer 52	2
Deelnemer 53	3
Deelnemer 54	2
Deelnemer 55	2
Deelnemer 56	1
Deelnemer 57	3
Deelnemer 58	1
Deelnemer 59	2
Deelnemer 60	3
Deelnemer 61	2
Deelnemer 62	3
Deelnemer 63	1
Deelnemer 64	1
Deelnemer 65	3
Deelnemer 66	1
Deelnemer 67	1
Deelnemer 68	2
Deelnemer 69	2
Deelnemer 70	1
Deelnemer 71	2
Deelnemer 72	2
Deelnemer 73	2
Deelnemer 74	2
Deelnemer 75	1
Deelnemer 76	3
Deelnemer 77	3
Deelnemer 78	1
Deelnemer 79	2
Deelnemer 80	2
Deelnemer 81	1
Deelnemer 82	2

Deelnemer 83	1
Deelnemer 84	3
Deelnemer 85	2
Deelnemer 86	3
Deelnemer 87	1
Deelnemer 88	3
Deelnemer 89	1
Deelnemer 90	2
Deelnemer 91	2
Deelnemer 92	2
Deelnemer 93	3
Deelnemer 94	1
Deelnemer 95	1
Deelnemer 96	1
Deelnemer 97	2
Deelnemer 98	1
Deelnemer 99	3
Deelnemer 100	2
Deelnemer 101	1
Deelnemer 102	3
Deelnemer 103	1
Deelnemer 104	2
Deelnemer 105	1
Deelnemer 106	3
Deelnemer 107	2
Deelnemer 108	2
Deelnemer 109	1
Deelnemer 110	1
Deelnemer 111	2
Deelnemer 112	1
Deelnemer 113	1
Deelnemer 114	3
Deelnemer 115	3
Deelnemer 116	2
Deelnemer 117	3
Deelnemer 118	1
Deelnemer 119	3
Deelnemer 120	2
Deelnemer 121	3
Deelnemer 122	1
Deelnemer 123	1
Deelnemer 124	2

Deelnemer 125	3
Deelnemer 126	1
Deelnemer 127	3
Deelnemer 128	1
Deelnemer 129	1
Deelnemer 130	3
Deelnemer 131	2
Deelnemer 132	2
Deelnemer 133	2
Deelnemer 134	3
Deelnemer 135	1
Deelnemer 136	1
Deelnemer 137	3
Deelnemer 138	2
Deelnemer 139	3
Deelnemer 140	3
Deelnemer 141	1
Deelnemer 142	2
Deelnemer 143	3
Deelnemer 144	3
Deelnemer 145	3
Deelnemer 146	1
Deelnemer 147	1
Deelnemer 148	1
Deelnemer 149	2
Deelnemer 150	1

Conditie 1 (met plasticfolie)	49
Conditie 2 (zonder folie en met een bordje met tekst)	51
Conditie 3 (zonder folie en zonder bordje met tekst)	50

## 2.5 Map of experimental room



## 2.6 Observation form

### REGISTRATION FORM

Participant:

Conditie:

Datum:

Tijd:

Observatie	Ja/Nee	Toelichting
Gewicht M&M's + schaalte <u>voor</u> de creatieve opdracht (gewicht zonder plastic folie!!!)		_____ gram
Gewicht M&M's + schaalte <u>na</u> de creatieve opdracht (gewicht zonder plastic folie!!!)		_____ gram
Gewicht M&M's + schaalte <u>voor</u> de smaaktest (gewicht zonder plastic folie!!!)		_____ gram
Gewicht M&M's + schaalte <u>na</u> de smaaktest (gewicht zonder plastic folie!!!)		_____ gram
Vraag m.b.t. presentatie M&M's (e.g. mag het plastic eraf?)		
Vraag m.b.t extra proeftijd		
Vraag m.b.t. laten staan M&M's tijdens invullen vragenlijst		
Extra uitleg nodig		
Externe invloeden		
Overige		

### **Optionele vragen**

Eventuele vragen die gesteld kunnen worden. Op al deze vragen moet eenzelfde antwoord worden gegeven. Ook moet er de mogelijkheid zijn dit te noteren.

- Ik houd niet van M&M's, mag ik dan wel mee doen?  
--> Tijdens de smaaktest moet je de M&M's wel proeven, maar verder kun je dat zelf beoordelen.

### **Creatieve opdracht**

- Ik ben niet creatief. --> Geeft niet, alle input is welkom.
- Mag ik al van de M&M's eten? Ja (en dit noteren).
- Waarom staat dit bordje tekst er? Om je te helpen (en noteren).

### **Vragenlijst 2**

- Ik heb niets gegeten? --> Is niet erg, Ik zie dat die nog niet vol genoeg is (en noteren)
- Ik heb het schaalpje niet aangeraakt.
- Ik heb nog geen M&M's gepakt.

### **Smaaktest**

- Wat is er veranderd? --> Daar mag ik helaas niets over zeggen.
- Ik moet nu weg. --> Dat mag, het onderzoek is geheel vrij (en noteren).
- Heb je water of crackers om te neutraliseren? Je moet toch altijd de smaak in je mond neutraliseren bij een smaaktest? --> We willen het zoveel mogelijk laten lijken op een natuurlijke situatie.



## 2.7 Debriefing experiment Creativity & Taste

Beste deelnemer,

Onlangs heb je meegedaan aan het onderzoek naar Creativiteit & Smaak, hier wil ik je hartelijk voor bedanken!

Ook wil ik je graag informeren over het precieze doel en de achtergrond van de studie. Het doel van onze studie was namelijk niet zozeer gericht op creativiteit maar vooral om te begrijpen wanneer mensen wel en niet van lekkers (zoals M&M's) kunnen afblijven. Daarom hebben jullie een creatieve opdracht gemaakt met een bakje M&M's op tafel. We hebben gekeken hoeveel iedereen ervan at. Op de foto's onderaan de e-mail kun je zien op welke manieren de M&M's aan deelnemers werden gegeven.

Nogmaals hartelijk dank voor je deelname!

Met vriendelijke groet,

Rosanne Erasmus

Foto 1

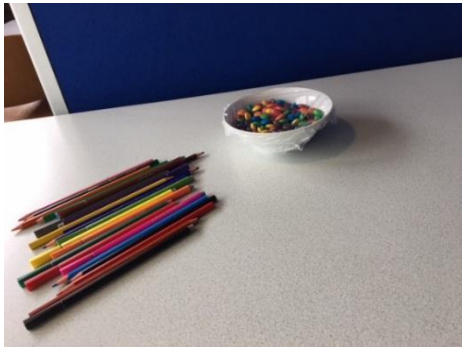


Foto 2

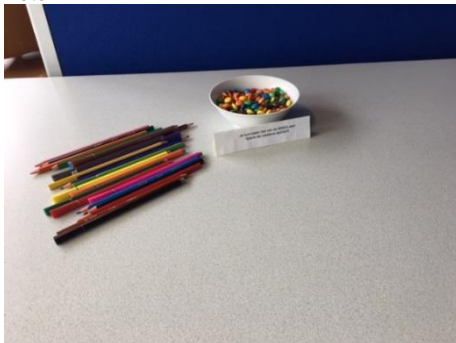
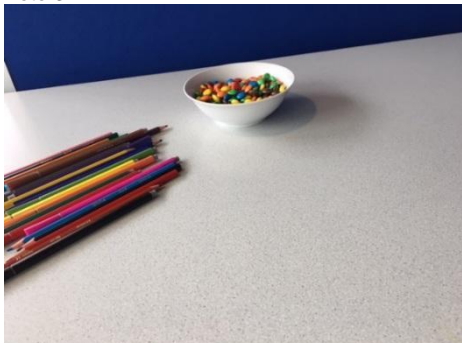


Foto 3



## Appendix C: Other materials

### 3.1 Approval ethical commission WUR



6702 in Hollandseweg 1, Wageningen | The Netherlands  
To whom it may concern

The following project proposal has been reviewed by the Social Sciences Ethics Committee (SEC):

Title: The influence of injunctive norms (text based versus cue based) on eating behaviour  
Project team: Rosanne Erasmus, Emely de Vet, Ellen van Kleef, Sonne Raghoebar  
Funding: NWO  
Period: January 2018 – June 2018  
Location: Wageningen

The Committee has concluded that the proposal deals with ethical issues in a satisfactory way and that it complies with the Netherlands' Code of Conduct for Scientific Practice.

With kind regards,



Professor Dr Marcel Verweij  
Chair Social Sciences Ethics Committee

Date:  
18 April 2018

Subject:  
Ethical approval of research project

Project number:  
6706 in Hollandseweg 1  
Wageningen  
The Netherlands

Project location:  
Building 201

Project name:  
Wageningen University

Project leader:  
Dr. M. Verweij

Project title:  
The influence of injunctive norms (text based versus cue based) on eating behaviour

Project description:  
The influence of injunctive norms (text based versus cue based) on eating behaviour

Project contact:  
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Wageningen University & Research  
Wageningen University & Research  
Wageningen University & Research

### 3.2 Overview all variables

Control variables	Independent variable	Mediator	Moderators	Dependent variables	Other variables
Age Gender Hunger state Level of relaxation Liking for chocolate Desire	Injunctive norms (cue, written text, control)	Psychological reactance	Healthy eating goal Need for autonomy	Hunger state Level of relaxation Liking for chocolate Desire Consumption CT Consumption TT Consumption total	Education Purpose of study

### 3.3 Overview in-depth results

Table 1. Overview educational programmes

1	Entrepreneur bakery	15.0% (N=22)
2	Supervisor	13.6% (N=20)
3	Chef	12.2% (N=18)
4	Self-employed baker	8.8% (N=13)
5	Other	50.4% (N=74)

Table 2. Overview variables after the manipulation

	<b>Cue (N=49)</b>		<b>Written text (N=49)</b>		<b>Control (N=49)</b>				
	M	SD	M	SD	M	SD	F	p	$\eta^2$
Hungerstate after manipulation	3.29	1.02	2.92	0.98	3.02	0.97	1.80	0.17	0.02
Relaxed after manipulation	4.12	0.66	4.00	0.79	3.78	1.01	2.19	0.12	0.03
Liking after manipulation	3.16	1.03	3.10	0.98	3.31	0.96	0.55	0.58	0.01
Desire after manipulation	3.18	0.99	3.10	0.99	3.20	0.91	0.15	0.86	0.00
Psychological reactance	1.69	0.96	1.80	1.06	1.84	0.93	0.29	0.75	0.00

## Statistics – Repeated Measures (two time points)

### Hunger state

A mixed between-within subjects analysis of variance was conducted to assess the impact of hunger state and condition. Hunger state correlated with liking and desire before the manipulation, therefore the variables were used as covariates. Hunger state before and after the manipulation was used as dependent variable and condition was used as independent variable. Besides, consumption during the creativity task was used as covariate to correct for consumption, it could be that participants consumed more and therefore were less hungry after the manipulation. Results showed that there was no main effect for time of measurement,  $F(1,141) = 3.178$ ,  $p=.077$ . Also, no effect was found for condition,  $F(2,141) = 2.548$ ,  $p=.082$ . Furthermore, there was no significant interaction effect between hunger state and condition, Wilks' Lambda = 0.98,  $F(2, 141) = 0.16$ ,  $p=.16$  partial  $\eta^2 = .03$ . It did not differ in which condition participants were, no differences between hunger state ratings.

### Liking for chocolate

A mixed between-within subjects analysis of variance was conducted to assess the impact of three different conditions on participants liking for chocolate, across two time periods (before and after the manipulation). Liking for chocolate before and liking for chocolate after the manipulation was used as dependent variable and condition was used as independent variable. Liking, desire and hunger state were included as covariates. There was no significant effect for time of measurement; liking for chocolate before or after the manipulation ( $F(1,142)=.30$ ,  $p=.863$ ). Also, no effect was found for condition,  $F(2,142) = .974$ ,  $p=.380$ . Furthermore, no significant interaction effect between liking for chocolate and condition was found,  $F(2, 142) = .587$ ,  $p=.557$ .

### Level of relaxation

A mixed between-within subjects analysis of variance was conducted for the level of relaxation. To examine whether the level of relaxation (emotional state) differed before or after the manipulation and between conditions. Level of relaxation before after the manipulation was used as dependent variables and condition was used as independent variable. Desire and hunger state were included as covariates. No significant effect was found for the effect for time of measurement,  $F(1,144)= 0.22$ ,  $p=.881$ . Also no effect was found for condition,  $F(2, 143) = 2.104$ ,  $p=.126$ . Furthermore, there was also no significant interaction effect between level of relaxation and condition,  $F(2,143) = 2.231$ ,  $p=.11$ .

### Desire

Another mixed between-within subjects analysis of variance was conducted to assess the impact of three different conditions and desire, across two time periods (before and after the manipulation). Desire before and after the manipulation was used as dependent variable and condition was used as independent variable. Hunger state was included as covariate.

There was no effect for time of measurement,  $F(1,144) = 1.577$ ,  $p=.211$ . Also, no significant effect was found for condition  $F(2, 143) = .732$ ,  $p=.487$ . Moreover, no significant interaction effect between desire and condition was found,  $F(2,143) = 2.485$ ,  $p=.087$ .