

The impact of different frames on attitudes towards overweight and obese individuals



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Abstract

Behavioural changes that support weight loss are currently obstructed by the negative impact of stereotyping on the population. A lot of experts have tried to reduce these negative attitudes towards overweight people with the help of framing. However, the effectiveness of all these studies was variable. The present study investigated the relation between presenting an environmental frame, perceived lack of willpower and negative attitudes towards overweight and obese people by performing a between-subjects experiment. There were a total of 158 participants; 52 people were randomly assigned to an environmental frame, 52 people to an individual choice frame and 54 people to a control group consisting of no frame. When the environmental frame was presented, the role of the environment was given as biggest underlying cause for obesity, when the individual choice frame was presented; a lack of will-power was given as biggest underlying cause for obesity and for the control group was no extra information given concerning the underlying cause for obesity. The study found that a decrease in perceived lack of willpower will reduce negative attitudes towards overweight and obese people. However, there was no significant difference found between the three conditions and attitudes towards overweight and obese people. Furthermore there was also no significant difference between the three conditions and the perceived lack of willpower of overweight and obese people. These results indicate that although the amount of perceived willpower will predict attitudes towards overweight and obese people, changing someone's beliefs by framing them is more difficult. Further research is needed to make adequate statements about the influence of frames on attitudes towards overweight and obese people.

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Introduction

One of the biggest problems of humanity nowadays is obesity. The Organization for Economic Cooperation and Development countries (2017) concludes that half of the adults are overweight, one fifth of the adults are obese and almost one in six children are too heavy. Moreover, we can expect a continuance of the increase of people with obesity for the next ten years (OECD, 2017).

When looking at the causes of obesity, there are many different factors that are related to excessive weight gain. One of these factors is the amount of willpower that someone possesses. Economic, social and cultural factors can also affect someone's weight. Furthermore, the environment someone lives in can have an influence on the weight. Our society supports excessive consumption of mostly energy dense food and products high in fat, since these products are cheap and easy accessible. Our obesogenic environment has an influence on our weight and experts state that our environment can therefore be held responsible for obesity (e.g. Sallis & Glanz, 2009; Brownell, Schwartz, Puhl, Henderson & Harris, 2009). If you combine the excessive consumption of unhealthy food with a lack of exercise, it increases chances on overweight and obesity (Sallis & Glanz, 2009).

Being overweight has a big impact on life. Excessive weight has, for example, consequences for the health of people. It increases chances of getting different types of cancer, hypertension and osteoarthritis and it lowers the number of healthy years someone lives and the number of years that one lives overall (Meldrum, Morris, & Gambone, 2017). However, the consequences of obesity are not only limited to someone's health. People with overweight or obesity are often getting judged, discriminated and labelled because of some of their attributes and characteristics, which are related to their weight. This phenomenon is called weight stigmatization (Puhl & Brownell, 2001, 2003).

Weight stigmatization occurs on a large scale. It has been shown to influence someone's employment chances, treatment in health care and education (Puhl & Brownell, 2001). In terms of employment, it is often thought that obese employees work slower, are more often ill and are more unattractive than other employees with a normal weight (Paul & Townsend, 1995). This can lower their chances when applying for a new job or asking for a promotion and it can affect their salary or the duration of their employment (Paul & Townsend, 1995). Secondly, research showed that medical professionals have a more negative attitude towards obese patients than non-obese patients (Young & Powell, 1985). This resulted in a decrease of good health care for overweight people and a reduction of the coverage of costs related to their health. At last, research showed that children often stigmatize other children (and adults) that are obese (Tiggemann & Annebury, 2000). Classmates regularly intimidate obese people and they often have negative prejudices about overweight students: they have a weight stigma (Puhl & Brownell, 2001).

Furthermore, the entertainment media, news media and food industry also support negative attitudes about obesity. Where the entertainment media presents obese characters as evil, unattractive, unfriendly and cruel (Herbozo, Tantleff-Dunn, LaRose & Thompson, 2004), the news media and food industry most often blames the person itself, since they believe is the responsibility of the individual (Kim & Willis, 2007; Brownell, Schwartz, Puhl, Henderson & Harris, 2009). This negative stereotyping has a negative effect on the behavioural change towards a healthier weight at population level, since weight stigmatization can cause a lot of stress and can be seen as psychological stressor (Tomiya, 2014). An increase in stress can result in having difficulties to lose weight or even gain more weight through the secretion of the hormone cortisol or since stress is a stimulus for eating. Weight gain can again result in an increase of weight stigmatization, which can mean that you get trapped in a vicious cycle (Tomiya, 2014). So in order to reduce a growth of overweight and obesity in the population and help individuals lose weight, it would be beneficial to better understand how to reduce the negative attitude towards overweight or obese individuals.

There is already a lot of research done on how weight stigmatization can be reduced. The study of Alberga, Russell-Mayhew, von Ranson and McLaren (2016) showed that an important factor underlying weight stigmatization appears to be 'personal responsibility'. If you believe that obesity is caused by a lack of personal control, it is more likely that you have a negative attitude towards people with overweight than when you believe that the cause of obesity is not related to the responsibility of the individual.

However, one way that might positively support our attitude towards obesity is by framing the cause of obesity in a different way. If you frame obesity in such a way that it is not seen as the main responsibility of the individual, this can change someone's point of view when it comes to overweight and obesity. While obese people are repeatedly seen as being responsible for the way they look, a large stream of literature showed that the environment in which one lives has a big influence on someone's body weight (e.g. Brownell, Schwartz, Puhl, Henderson and Harris, 2009; O'Brien, Puhl, Latner, Mir and Hunter, 2010; Thorsteinsson, Loi and Breadsell, 2016). In our obesogenic environment is constant temptation existing with the presence of mostly energy- and fat-dense food. It supports the consumption of unhealthy products. In order to make changes, it has been stressed by several authors that we have to change our focus to models that are based on the idea that obesity is related to environmental factors (e.g. Crandall, 1994; Sallis & Glanz, 2009; Weiner, Perry and Magnusson 1988). If we focus on the environment instead of individual responsibility, people would get easier along with these changes in social policy.

This paper examined whether you can reduce negative attitudes towards overweight and obese people by focussing on the role of the environment instead of personal responsibility as biggest underlying cause for obesity. The main research question of this study was: *'What is the effect of exposure to an environmental frame versus an individual choice frame on someone's attitude towards overweight and obesity?'* In order to answer this question, an experiment was carried out. In this experiment was examined whether a text explaining the causes of overweight in an 'individual choice' frame versus an 'environment influence' frame would impact the attitude towards obesity.

The experiment started with presenting a general text related to obesity, after which participants were randomly assigned to three conditions in which they read about the main underlying reasons for becoming overweight. When the environmental frame was used, the role of the environment was given as biggest underlying cause for obesity. When the individual choice frame used, a lack of will-power (i.e. eating too much and exercising too little) was given as biggest underlying cause for obesity. The third condition was a control group where no frame was used. After reading the text, the participants were asked to answer a few questions related to weight stigmatization.

If this research would show that people indeed would have a better attitude towards others with overweight or obesity when you show them that the most dominant cause for obesity is the environment you live in, we can start with implementing this data in real life by developing public campaigns that help us to reframe the cause of overweight and obesity.

Theoretical framework

The nature, magnitude and consequences of weight stigmatization in society

The frequency of weight stigmatization and discrimination has significantly increased over the last twenty years. This can be explained by the increase of people with obesity, which occurred synchronously with a change in societal attitudes and the contribution of the media as mediator for weight stigmas (Andreyeva, Puhl & Brownell, 2008). The prevalence of weight discrimination is nowadays almost at the same level as race and age discrimination, from which we can conclude that weight stigmatization has become a large-scale threat (Andreyeva et al, 2008). This can result in, for instance, an increase in stress, which stimulates people to eat even more (Tomiyama, 2014).

Cramer & Steinwert (1998) investigated if weight stigmatization already exists at a very young age. In one of their studies they examined preschool children from the age of three to five. The researchers created different sets, each including three figures with different body sizes: thin, average and chubby. Half of the sets contained a picture of a girl and the other half contained a picture of a boy. With four tasks they tried to look at the reaction of the children towards the different figures. The results of the study indicated that weight stigmas are created by the stereotype that people have of overweight and obese individuals, which is mostly influenced by our culture. The children that participated in the experiment gave more negative characteristics to overweight people than thin people. Being thin is seen as equal to being attractive. This result indicates that weight stigmatization already existed with preschool girls and boys. However, the older the respondents were, the stronger their stigma. In conclusion, stigmatizing someone because of their weight already happens from a very young age and negative opinions towards people with overweight and obesity will only develop further when children get older.

In the study of Weiner et al. (1988) they compared the perceived controllability of causes of different stigmas. Like child abuse and drug addictions, obesity is a stigma that is classified as mental-behavioural stigma. These stigmas are often perceived as controllable and unstable and are linked to no pity and anger towards the stigmatized person, together with an aversion for helping or liking. People have less sympathy towards others with mental-behavioural problems and believe that – in the case of weight stigma – it is the responsibility of the individual that they gained so much weight. If they had the self-control to eat healthier and exercised more they would not be overweight: take responsibility and admit you are accountable.

Being overweight is seen as a personal responsibility

Personal responsibility is related to the strength of someone's weight stigma. In two studies, De Jong (1980) showed the relation between weight stigma and assumptions related to the cause of obesity. In the first study, de Jong used a 2 x 2 factorial design where half of the participants saw an obese girl and half of the participants saw someone with a normal weight. The other dimension was related to the cause of the overweight for the obese girl or 'paleness' for the normal-weight girl: half of the participants were told that the person they saw had a thyroid problem and the other half did not get any further explanations. The results of this study showed that the negative attitude towards the girl with overweight (and without the thyroid problem) was caused by the assumption that she lacked self-control. Participants thought that this obese girl had less willpower than the normal-weight girl. However, when the overweight of the girl was caused by problems with her thyroid, the girl was evaluated more positive than when she was heavy because of a lack of self-discipline.

In the second study De Jong used a 2 x 3 factorial design, where again half of the participants was told that the girl they saw had a thyroid problem and the other half was not. Furthermore, he made a distinction between the weights of the girls: one group got a text about an obese girl, the second group about an obese girl who already lost some weight and the third group about a girl with a normal weight. Just like the first study, de Jong wanted to examine the relationship between overweight and self-control. This study confirmed the results of the first study that showed that the obese girl was evaluated as less self-disciplined in comparison with the obese girl who has a thyroid problem. The

study also showed that the obese girl who lost weight was ranked more positive than the obese girl who did not lose weight but more negative than the obese girl with the glandular disorder.

All taken together, both studies showed that the degree of personal responsibility for someone with overweight is negatively related to how they are evaluated. In other words, if you are convinced that overweight is related to the absence of willpower, you have a more negative view towards obesity and therefore a stronger weight stigma.

Research on reducing weight stigma by focusing on the influence of the environment

The fact that weight discrimination and stigmatization happen so frequently show that it is important to make changes towards a more obesity-friendly society. Since there is a link between the belief that it is someone's personal responsibility that he or she gained weight and the strength of the stigma, you might be able to reduce the stigma by shifting the cause of obesity. Several studies are carried out around this topic with all their own method to try to reduce weight stigmatization. The effectiveness of all these studies is variable.

In some studies the link between the controllability of the cause of obesity and attitudes towards overweight and obese people is missing. In the study of Anesbury and Tiggermann (2000) they investigated if you can reduce weight stigmatization by explaining that the cause of obesity is not fully under the control of the individual. In their study they started by letting children fill in a questionnaire containing questions related to negative stereotyping and controllability of people with overweight. A week later the group of children was separated: one group became the intervention group where the children got a short intervention of approximately ten minutes about the uncontrollability of weight and the other group was the control group where the children were doing normal activities during this time. Afterwards, both groups were again asked to fill in a questionnaire about negative stereotyping and controllability of obesity. The results of the study showed that the reduction in weight controllability between questionnaire one and two was significantly larger for the intervention group than the control group. However, the reduction for negative stereotyping between the two questionnaires was not greater for the intervention group than the control group. So, although you can change the attitude of children towards obesity, the authors concluded that changing negative stereotyping of obese people cannot be done so easily.

Self-control is regularly seen as a controllable cause for obesity, while the environment is seen as an uncontrollable cause. Thorsteinsson, Loi and Breadsell (2016) performed an experiment where, among other things, they wanted to investigate the relation between weight stigmatization and the controllability of the main cause for overweight. For their study they divided their participants in three groups: one group read an essay wherein they explained that the main cause for weight gain is the uncontrollable environment, the second group read an essay about the controllable factor 'self-control' as determinant for obesity and the third group – the control group – did not read an essay. The researchers predicted that controllable factors would result in an increase of weight stigmatization and uncontrollable factors in a decrease. Their study showed no significant difference between the weight controllability on the prejudice for group one and two compared to the third control group. According to the authors of the article, this outcome could be explained by the fact that the frames on their own do not change someone's attitude towards people with overweight and obesity. Although it is possible that presenting information about weight controllability could influence someone's attitude, there are a lot of different other factors that should be considered.

However, in contrast to the studies presented above, there are also studies that concluded that it is possible to change attitudes towards overweight and obese people. The study of Crandall (1994), for example, showed that you can change negative stereotyping if you focus on physiological and genetic factors as cause for obesity. If you stop paying attention to the controllability of obesity, but focus on uncontrollable factors, you can also expect a reduction of negative feelings to obesity. This can, for instance, occur by focussing on the uncontrollable environment as cause for weight gain.

The study of O'Brien et al. (2010) examined if you can reduce weight stigmas by teaching people about the uncontrollable factors that cause obesity. The participants of this study followed twelve tutorial classes of one hour a week. They were randomly assigned to one of three conditions: one course focused on alcohol use of young people (this was the control condition), the second course focused on the behavioural causes and interventions of obesity and the third condition focused on the uncontrollability of obesity with causes like the environment and genes. After following the tutorials, the participants had to finish an oral and written assignment. Before and after the intervention were measurements taken. The results of this research indicated a decrease in weight stigma in the condition focusing on the uncontrollability of obesity for two measures of implicit anti-fat prejudice and one explicit anti-fat prejudice. There was an increase in weight stigma visible in the condition focusing on the behavioural causes of obesity for motivated/ lazy implicit anti-fat prejudice. However, in none of the three conditions were any changes in beliefs regarding obese individuals and control in dieting. Overall, we can conclude from this research that you can influence weight stigma by framing the cause of obesity.

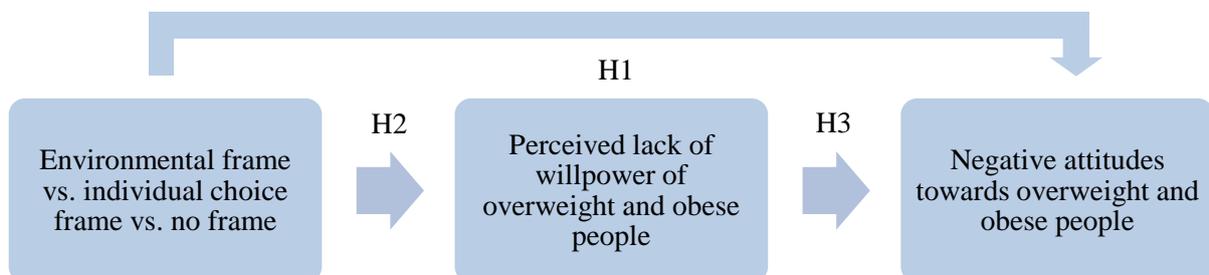
A possible explanation for the relation between the presented frame and attitudes towards overweight and obese people can be given by the attribution theory of Weiner et al. (1998). This theory states that the cause that an individual believes is related to a particular stigma will decide how this person will react towards the stigmatized individual. If a person thinks that overweight and obesity is caused by a lack of willpower, he or she will act in accordance with this belief towards overweight and obese individuals and will therefore have a more negative attitude towards overweight and obese people than someone who believes that obesity is uncontrollable and caused by impulses from the environment.

Conceptual framework and hypotheses

In this study, the relation between presenting an environmental frame, perceived lack of willpower and negative attitudes towards overweight and obese people was investigated. Based on the literature above were the following hypotheses formulated:

- H1: Compared to an individual choice frame and no frame, people exposed to an environmental frame will have a less negative attitude towards overweight and obese people;
- H2: By focusing on the environment as cause of obesity instead of individual choices, perceived lack of willpower of overweight and obese people will decrease;
- H3: A decrease in perceived lack of willpower of overweight and obese people will reduce a negative attitude towards overweight and obese people.

Below is the conceptual model for this study presented with 'environmental frame vs. individual choice frame vs. no frame' as independent variable, 'negative attitudes towards overweight and obese people' as dependent variable and 'perceived lack of willpower of overweight and obese people' as the mediator. The expectations were that the environmental frame would cause a less negative attitude towards overweight and obese people than the individual choice frame and no frame. The attitude of people presented to no frame was expected to be less negative than people presented to the individual choice frame but more negative than people presented to the environmental frame.



Method

Research design and procedures

In this study a between-subjects experiment was conducted in which a text that described the causes of overweight was manipulated. The experiment had three different conditions: for the first condition an environmental frame was used where the focus was on the environment as main cause for overweight, for the second condition an individual choice frame was used where the focus was on a lack of willpower as main cause for overweight and for the third condition no frame was used, since this condition applied as a control group.

The data of this study was collected using an online administrated questionnaire (see appendix for questionnaire). Participants were asked to participate in a short study related to overweight and obesity in our society. There deliberately was not chosen to tell the participants that the study was related to weight stigmatization, since this could affect the answers they might give. Before the participants started their survey, they got a time indication of how long it would take them to finish the questionnaire. There was also explicitly mentioned that all personal data relating to the participation in the study was held and processed in strictest confidence.

After the participants agreed to take part in this research (informed consent), each participant was presented a text related to overweight and obesity in the population. The first part of the text was the same for every participant. This text was presented to give every participant some information about obesity and the consequences that being obese can have for your health. According to the condition that the participant was assigned to, the text above might have an extra paragraph related to the cause of obesity. Table 1 displays the text that each condition contained.

After the participants read the text they had to answer some questions, which were related to the extent in which their attitude towards overweight and obese individuals was negative. Subsequently, a control question was asked. The participants had to indicate the extent to which they believed that the text they read was credible. This question was included to rule out the alternative explanation that a frame was deemed less credible.

After answering questions related to their attitude towards overweight and obesity, the respondents were asked to answer some more general questions, like their gender, age, height and weight.

Participants

In total, 158 respondents participated in the study, which consisted of 51 men (32%) and 107 women (68%) Furthermore, 52 respondents were assigned to the environmental frame, 52 respondents were assigned to the individual choice frame and 54 respondents were assigned to the condition that had no frame. All participants were randomly assigned to a condition by the program Qualtrics that was used to develop the questionnaire. The participants were recruited through Facebook and WhatsApp.

Table 1 *Text per frame about overweight and obesity, its causes and potential solutions*

Environmental frame	Individual choice frame	No frame
Introductory text		
<i>Overweight and obesity have become a serious problem for our society, since half of the adults and one in six children are overweight (Organisation for Economic Co-operation and Development, 2017). Moreover, we can expect a continuance of the increase of people with obesity for the next decade.</i>		
<i>Being obese has a big impact on life. Excessive weight has, for example, consequences for your health. It increases your chances of getting different types of cancer, hypertension and osteoarthritis and it lowers the number of healthy years you live and even the number of years you live overall (Meldrum, Morris, & Gambone, 2017).</i>		
Text about causes of obesity	Text about causes of obesity	
<i>Scientific research has shown that obesity is mainly caused by environmental factors (e.g. Brownell, Schwartz, Puhl, Henderson & Harris, 2009). We live in an environment where the main focus is on the consumption of calorie- and fat-dense foods. We have easy access to food and unhealthy products are often very cheap. Also the amount and variation of food increased, since we have more food available and there is a bigger product range of unhealthy products than a few decades ago (Sallis & Glanz, 2009). An environment like this with a constant flow of the production and consumption of unhealthy products is also called an obesogenic environment, since highly processed products, which contain a lot of sugar can cause obesity (Meldrum, Morris & Gambone, 2017).</i>	<i>Scientific research has shown that obesity is mainly caused by the kind of products we consume and the amount of exercise we get (e.g. Meldrum, Morris & Gambone, 2017). Consumption of too much products that are high in energy, fat and/or sugar increase the chances of weight gain. Furthermore, too little exercise can also contribute to overweight and obesity. Your energy intake and expenditure should be in balance in order to maintain your current weight (Hill, Wyatt & Peters, 2012). If you eat more calories than you expend, you will gain weight.</i>	
Text about solutions	Text about solutions	
<i>In order to reduce obesity, we should make changes in our environment that will help obese individuals to lose weight. We can, for example, promote the intake of vegetables and fruits or make sure that everyone has access to and can afford healthy products (Sallis & Glanz, 2009).</i>	<i>In order to reduce obesity, we should help obese individuals to lose weight by supporting them to follow a healthy diet in combination with exercising on a regularly basis (Dahlkoetter, Callahan & Linton, 1979). We have to help individuals to gain a balance between their energy intake and energy expenditure (Hill, Wyatt & Peters, 2012).</i>	

Measures

The questions that were used to indicate someone's attitude towards overweight and obese individuals came originally from the Anti-Fat Attitude questionnaire by Crandall (1994). This questionnaire was developed to test someone's explicit weight stigma. The survey used a 9-item Likert scale to answer the questions, with a range from the item 'very strongly disagree' to the item 'very strongly agree'. The questionnaire was divided into three parts: one was related to questions about prejudice towards people with obesity, one was related to the amount of fear for becoming obese and the last one was related to what extent they believed willpower was linked to obesity (the controllability of obesity). The part which was related to the amount of fear for becoming obese was not included in this survey, since other studies that used this scale found no relation between these questions and one's attitude towards obesity (Crandall, 1994; O'Brien et al., 2010). However, the questions related to prejudices and willpower gave a good indication of someone's attitude towards overweight and obesity.

Dependent variable – negative attitudes towards overweight and obese people

Cronbach's Alpha was calculated to see if the questions from the Anti-Fat Attitude questionnaire could be combined to questions related to 'negative attitudes towards overweight and obese people' and to questions related to 'a perceived lack of willpower of overweight and obese individuals'. The scale with the seven questions related to 'negative attitudes towards overweight and obese people' was found to be highly reliable (7 items, $\alpha = 0.87$). When looking at each individual item on the scale (table 2), the item 'Few of my friends are overweight or obese.' would increase Cronbach's Alpha to 0.91 if it would be deleted (6 items). Since the correlation of this item with the other items was very low, the choice was made to not further consider this item in future analyses.

Table 2 Cronbach's Alpha of 7 item 'negative attitudes towards overweight and obese people' scale

	Item - Total Correlation	Cronbach's Alpha if Item Deleted
- Few of my friends are overweight or obese.	.226	.905
- I tend to think that people who are overweight are a little untrustworthy.	.724	.841
- Although some overweight people must be intelligent, generally I think they tend not to be.	.711	.841
- I have a hard time taking overweight people too seriously.	.757	.837
- Fat people make me somewhat uncomfortable.	.685	.845
- If I were an employer, I might avoid hiring an overweight person.	.737	.838
- I dislike people who are overweight or obese.	.753	.838

Perceived lack of willpower of overweight and obese people

When looking at the reliability of the scale with the three questions related to 'a perceived lack of willpower of overweight and obese individuals', there was a Cronbach's Alpha of 0.75 (3 items). Since the Cronbach's Alpha would decrease if one of the items would be deleted, all three items are considered in further analyses (table 3).

Table 3 Cronbach's Alpha of 3 item 'a perceived lack of willpower of overweight and obese individuals' scale

	Item - Total Correlation	Cronbach's Alpha if Item Deleted
- People who weigh too much could lose at least some part of their weight through a little exercise.	.589	.677
- Some people are overweight because they have no willpower.	.576	.688
- It is people's own fault if they are overweight.	.604	.634

Control variables and manipulation check

After removing one of the items from the scale related to negative attitudes, there was looked at the average age of the correspondents and investigated whether the average age per condition was about the same. There was also looked at the division of men and women over the conditions. Furthermore, everyone's BMI was calculated with the data of their length and weight by using the formula $\text{weight} / \text{length}^2$, with weight in kilogram and length in meters (Bosman, 2013). Since a BMI higher than 25 indicates overweight and a BMI smaller or equal to 25 indicates a healthy weight, the participants were for some analyses divided into two group: one group containing participants with a BMI smaller or equal to 25 and one group containing participants with a BMI larger than 25.

Moreover, a manipulation check was carried out to investigate whether the text of the condition that participants were assigned to was perceived as credible. This check was executed by comparing the three conditions based on the answer they gave to the following control question: 'The text that I just read about overweight and obesity in our society was credible.'. The answer to this question had to be filled in on the same 9-item Likert scale that was used to answer the questions of the Anti-Fat Attitude questionnaire.

Data analysis

After collecting all the data with the program Qualtrics it was converted to SPSS. Different analyses were carried out. Randomisation checks were executed for the variables 'age', 'gender' and 'BMI'. The randomisation check for the variable 'age' was performed by executing a one-way ANOVA, the variable 'gender' was checked by a chi-square test and the variable 'BMI' was checked by performing both a chi-square test and one-way ANOVA. Besides, a manipulation check was carried out by performing a one-way ANOVA to check if the participants thought that the presented text was credible.

Before focussing on the hypotheses the correlation and reliability of the study variables was investigated by performing a correlation analysis. Hypothesis 1 and 2 were examined by performing one-way ANOVAs and hypothesis 3 was investigated by performing a linear regression analysis.

Results

Randomisation and manipulation checks

Randomisation checks

Age

The average age of all respondents was 29.13 years old ($SD = 12.99$) with a minimum of 14 years old and a maximum of 77 years. To check whether the average age per condition was about the same, a randomisation check was executed. This check showed that there was no significant difference between the participants per condition, $F(2, 155) = 0.02, P = .97$. The difference between respondents of the environmental frame ($M = 28.92, SD = 13.52$), the individual choice frame ($M = 29.40, SD = 12.93$) and no frame ($M = 29.06, SD = 12.77$) were minimal.

Gender

In total, 51 men and 107 women participated in this study. A chi-square test was performed to check the division of men and women between the three conditions. This test showed that there was no significant difference in the amount of men and women between the conditions, $X^2(2, N = 158) = 1.02, P = .60$.

BMI

Of all participants, 40 people belonged to the group with a BMI higher than 25, which indicates that these people have overweight and 117 people belonged to the group with a BMI lower or equal to 25, which indicates that these people have a healthy weight. One person did not want to give the data of his or her weight, causing the data of one participant to be missing. To check whether the participants were equally divided between the three conditions, a chi-square test was performed which showed no significant difference in BMI between conditions, since $X^2(2, N = 157) = 1.17, P = .56$. There was also a one-way ANOVA performed for which there was no separation made in the two groups of participants with overweight or a healthy weight. This analysed also showed no significant difference in BMI ($F(2, 155) = 0.56, P = .58$) between the environmental frame ($M = 23.30, SD = 3.59$), the individual choice frame ($M = 22.57, SD = 5.54$) and no frame ($M = 22.35, SD = 5.21$).

Manipulation check

To check whether the respondents thought that the text that was presented in the condition they were assigned to was credible, the following control question was asked: 'The text that I just read about overweight and obesity in our society was credible.' There was no significant effect found between the condition participants were assigned to and the extent to which they thought the text was credible, $F(2, 155) = 0.79, P = 0.46$. The environmental frame ($M = 6.21, SD = 1.33$), individual choice frame ($M = 6.44, SD = 1.23$) and the control group with no frame ($M = 6.13, SD = 1.40$) did not differ from each other with respect to the credibility of the presented text.

Descriptive statistics

The associations between age, BMI, a perceived lack of willpower and negative attitudes towards overweight and obese people was explored by a correlation analyses (table 4).

Table 4 Correlation of key variables

Variables	N	Mean	SD	Correlations					
				1.	2.	3.	4.	5.	
1. Age	158	29.13	12.99	1.00					
2. BMI	157	22.74	4.85	.182*	1.00				
3. Credibility of the presented text	158	6.26	1.32	-.351**	-.146	1.00			
4. Perceived lack of willpower***	158	5.80	1.47	-.204*	-.224**	.329**	1.00		
5. Negative attitudes towards overweight and obese people***	158	3.51	1.69	-.012	-.135	.108	.450**	1.00	

The more weight people carry, the less they see overweight as a lack of willpower and the less negative their attitude is towards overweight and obese people.

***. Both 'Perceived lack of willpower' and 'Negative attitudes towards overweight and obese people' are measured on a 9-item Likert scale.

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results indicate that 'Negative attitudes towards overweight and obese people' was positively relate to 'Perceived lack of willpower' ($r = .45$, $p < .001$). Furthermore, 'Age' was negatively correlated to the variables 'Negative attitudes towards overweight and obese people' ($r = -.01$, $p = .88$) and 'Perceived lack of willpower' ($r = -.20$, $p = .01$). 'BMI' was also negatively related to 'Negative attitudes towards overweight and obese people' ($r = -.14$, $p = .09$) and 'Perceived lack of willpower' ($r = -.22$, $p = .005$). 'Credibility of the presented text' was positively correlated to 'Negative attitudes towards overweight and obese people' ($r = .11$, $p = .18$) and 'Perceived lack of willpower' ($r = .33$, $p < .001$).

Testing the hypotheses

After executing the analyses above, the three hypotheses were inspected. A one-way ANOVA was performed to find out if differences between groups are significant. Table 5 shows that for the environmental frame, individual choice frame and no frame there were on average no major differences between the perceived lack of willpower or negative attitudes towards overweight and obese people.

Table 5 Perceived lack of willpower and negative attitudes towards overweight and obese people as a function of the different frames among the respondents (N = 158)

	Environmental frame (N = 52)		Individual choice frame (N = 52)		No frame (N = 54)		P value for main effect
	Mean	SD	Mean	SD	Mean	SD	
Randomisation checks							
Age	28.92	13.52	29.40	12.93	29.06	12.77	.981
BMI	23.30	3.59	22.57	5.54	22.35	5.21	.575
Manipulation check	6.21	1.33	6.44	1.23	6.26	1.32	.456
Perceived lack of willpower	5.59	1.56	5.96	1.49	5.85	1.36	.432
Negative attitudes towards overweight and obese people	3.78	1.69	3.53	1.93	3.24	1.40	.257

Compared to an individual choice frame and no frame, people exposed to an environmental frame will have a less negative attitude towards overweight and obese people (H1).

Framing obesity by focussing on the environment as cause had no significant effect on their negative attitudes towards people with overweight and obesity, $F(2, 155) = 1.37, P = 0.26$. The difference between the environmental frame ($M = 3.78, SD = 1.69$), the individual choice frame ($M = 3.53, SD = 1.93$) and exposure to no frame ($M = 3.24, SD = 1.40$) were minimal. Hypothesis 1 is therefore rejected.

By focusing on the environment as cause of obesity instead of individual choices, perceived lack of willpower of overweight and obese people will decrease (H2).

The effect of an environmental frame with respect to an individual choice frame and no frame on perceived lack of willpower overweight and obese individuals was not significant, $F(2, 155) = 0.88, P = 0.43$. There was no significant difference in perceived lack of willpower between the environmental frame ($M = 5.59, SD = 1.56$), individual choice frame ($M = 5.96, SD = 1.49$) and no frame ($M = 5.85, SD = 1.36$). This means that hypothesis 2 is rejected.

A decrease in perceived lack of willpower of overweight and obese people will reduce a negative attitude towards overweight and obese people (H3).

A linear regression was executed to predict someone's negative attitudes towards overweight and obese people based on the perceived lack of willpower of overweight and obese people. Based on the data from table 6, there can be concluded that the perceived lack of willpower of overweight and obese people significantly predicted someone's negative attitudes towards overweight and obese people, $b = 0.52, t(156) = 6.29, P < .001$. Perceived lack of willpower also explained a significant proportion of variance in someone's negative attitudes towards overweight and obese people, $R^2 = .20, F(1, 156) = 39.62, P < .001$.

Table 6 Linear regression

	Unstandardized coefficients		β
	B	SE B	
Constant	0.515	0.491	
Perceived lack of willpower	0.516	.082	.45*

*Note: $R^2 = .20$. * $P < .001$*

Discussion

Theoretical implications and relevance

This research showed that the perceived lack of willpower of overweight and obese people has an influence on the attitude towards overweight and obese people. If someone believes obesity is within the control of the individual, you have a more negative attitude towards obese people. Other studies conformed these findings, for instance, the study of Anesbury & Tiggemann (2000), the study of Crandall (1994) were they used the same scale to measure anti-fat attitudes and the study of De Jong (1980) that showed the correlation between negative attitude towards overweight girls and the assumption that they lacked self-control. Also the attribution theory of Weiner is consistent with these findings, which states that perceived controllability of overweight and obesity has an effect on the evaluation of fat people (Weiner et al., 1998).

The study further hypothesized that instead of presenting an individual choice frame or no frame, an environmental frame would decrease a negative attitude towards overweight and obese individuals. However, there was no difference in attitude found between the three frames. Furthermore, the results showed that reading a text about possible causes for obesity had no effect on the perceived lack of willpower. This indicates that the presentation of a frame alone was not enough to influence the participants. This outcome is in line with the studies of Thorsteinsson, Loi and Breadsell (2016) and Lippa & Sanderson (2013) were they also did not found a relation between the frame they presented and the extent to which people were prejudiced towards overweight and obese people. A possible explanation that the authors gave for the absence of a relation was that a change in attitude cannot be explained by only focussing on the attribution theory. Other variables should be considered as possible mediators, like body image. This makes it a complex matter that cannot be solved in one particular way. The study of Lippa & Sanderson (2013) showed that although some changes might be found in causal beliefs towards obesity when you use different frames, this does not automatically change weight stigmatization.

A lot of different methods have been used to try to reduce negative attitudes towards people with overweight and obesity. The study of O'Brien et al. (2010), for example, found a relation between prejudice and the extent to which people believe obesity is controllable by using twelve tutorial classes as method. This indicates that the duration of the intervention could be an important factor when it comes to reducing negative attitudes towards overweight and obese individuals. However, the review of Daniélsdóttir, O'Brien and Ciao (2010) showed that there was a lack of consistency between lots of different interventions that were used by multiple studies. Moreover, the articles that were examined regularly did not use randomized designs, a lot of different measurement scales were used and only a few studies took measures both before and after the intervention. Together with the fact that there is a lack of studies that examine the long-term effects of different interventions, there can be said that it is difficult to give proper suggestions of intervention to alter attitudes based on the current studies.

The results of the study further showed that a negative correlation was present between someone's age, their perceived lack of willpower and their attitudes towards overweight and obese people. This indicates that if you become older, you get milder when it comes to people with overweight and obesity. These results are in line with results of the study performed by Puhl, Andreyeva and Brownell (2008) that showed a decrease in weight discrimination with participants of 65-74 years old in comparison to participants aged 25-34. This indicates that the older you become, the less you blame overweight individuals that they are the one responsible for the weight gain because of a lack of willpower and the milder your attitudes gets towards people with overweight and obesity.

Furthermore, a negative correlation was found between one's BMI, their perceived lack of willpower and their attitude towards overweight and obese people, which shows that people with a high BMI are less critical towards others with overweight or obesity. This means that negative attitudes appear more often with people who have a healthy weight relative to people with overweight. So, the more weight people carry, the less they link overweight and obesity to a lack of willpower and the less negative their attitude is towards other people with overweight and obesity. Another explanation that can be given to support the possibility that overweight might have become more acceptable is that there has

been an increase of people with overweight and obesity. If more people are overweight, we might accept being overweight more easily, since it has become more common. Besides, research has shown that parents often underestimate the weight of their overweight children and see no risk for the health of their children (Townes & D'Auria, 2009). They may not have enough knowledge to make a proper judgement of when their child is overweight or they might want to avoid any judgements that could be made towards the child because of his or her weight. Nonetheless, parents have problem detecting the weight of their children. However, underestimating weight does not only occur with parents, the review of Robinson (2017) showed that we also have problems with our own perception of weight. Mainly people with overweight often falsely identify their own weight and believe they weigh less than they actually do. This might influence how we identify the weight of others and thereby the extent to which we are stigmatization. Furthermore, we can speculate how long weight stigmatization will still be an issue of discussion. Since more people gain weight, there might come a point where overweight is seen as the standard in contrast to people with a normal weight.

At last, the degree to which someone has negative attitudes towards overweight and obese people was positively correlated to the perceived lack of willpower, which shows that if you believe that someone with overweight or obesity lacks willpower, you are more likely to have a negative attitude towards overweight and obese individuals. Since we know that a perceived lack of willpower is related to a negative attitude, we can start with finding methods that can change those attitudes in order to take care of the problems that appear around weight stigmatization. The idea that overweight is solely caused by a lack of willpower is too limited for a complex matter like this.

Limitations and suggestions for future research

Assuming that most of the participants were highly educated, since the questionnaire is spread within a network of mostly students, combined with the fact that this study consisted for two-third of female participants makes it difficult to generalise these results for the whole population. Additionally, more than 90 percent of the participants were Dutch, so generalizing to a population that is not only limited to Dutch citizens is also not accurate.

Moreover, every participant was presented a text related to obesity, which was supposed to be used to frame the participants. However, there cannot be said with full certainty that the participants properly read the whole text. If participants did not read the text, this might have had an influence on the results. For a future online survey, this problem can be solved by adding a time slot of, for example, one or two minutes according to the length of the text, before the participant is allowed to go to the next question. However, there must be considered that this might increase the amount of participants that drop out during the questionnaire, because fast readers then have to wait before they can go one to the next part of the survey.

Furthermore, the research is performed using self-reports. Data collected with the use of self-report questionnaires depends entirely on the honesty of the participants. On sensitive topics as the extent to which you believe people with overweight are untrustworthy, not intelligent or have no willpower, it is possible that participants are not willing to answer totally honest and give a socially desirable answer (McDonald, 2008). Another problem that can occur when using a self-report questionnaire with a Likert scale has to do with how the respondents interpret the scale that is used (McDonald, 2008). For example, if two people have the same opinion, it is possible that the first person rates a 7 on the scale and the other person rates a 5, because they give another meaning to the different scale rates. This makes it more difficult to interpret the data from the study. Besides, although there is tried to remove the attention from the actual topic of the study – attitudes towards overweight and obese people – it is possible that some respondents were able to uncover the topic of the study, because of the questions that were asked. This could also have had consequences for how participants answered the questions. However, using an online survey protects the anonymity of the respondents and the Likert scale is an easy tool to test the reliability of items.

Moreover, it could be doubted if someone's BMI is an accurate way of measuring if they are overweight. Even though it is a method that is easy to understand and use - since you only need

someone's weight and length to determine their BMI - the method does not consider other important factors, like someone's age. When getting older, it is likely that the percentage of body fat will rise while the muscle mass will decline. However, this does not necessarily have an influence on someone's BMI, since length and weight do not also automatically change (Rothman, 2008). Besides, differences in total body fat and muscle mass for men and women are also not considered when measuring someone's BMI (Gallagher, Visser, Sepulveda, Pierson, Harris & Heymsfield, 1996; Burkhauser & Cawley, 2008). This can lead to falsely assessing people as being overweight, which occurred in 2002 when more than half of the American soldiers were evaluated as overweight, because their BMI was too high. However, because the soldiers had a high muscle mass, they were not overweight but just very muscular (Ayres, as cited in Bosman, 2013).

Another factor that is not considered when calculating someone's BMI is their ethnic background. Ratios between mass and body composition differ for various ethnic groups (Heymsfield, Peterson, Thomas, Heo & Schuna, 2016). Another method that can be used to indicate if someone is overweight or obese is measuring their waist circumference (Lean, Han & Morrison, 1995). This method is especially convenient to use when interested in the fat distribution, which cannot be determined by someone's BMI. A combination of both methods might be the best way to indicate if someone is overweight (Tuttle, Montoye & Kaminsky, 2016).

At last, since there was no relation found between someone's attitude towards overweight and obese individuals and the frame that was presented, it could be beneficial to apply the frame in a different way. The study of O'Brien et al. (2010) created, for example, three different twelve-week courses (environmental frame, behavioural frame and control condition) to subsequently see the effect of the followed course on weight stigma. Since this study succeeded in finding a relationship between the presented frame and weight stigma, it might be necessary to increase the duration of the intervention to find differences in attitude. If you spend more time on teaching people about the main cause of overweight – for instance, by following a course – it might be possible that the core of the message is better received and it allows the participants to process all information.

Another reason that could explain the lack of a relation between the frame and someone's attitude is that the participants had to answer questions related to weight stigmatization only after they read the text. If the participants would have also answered questions about their attitude towards overweight people before the intervention, you would have been able to detect if there were any differences between the answers before and after the experiment and then link them to the frames to see if the frame really positively or negatively changed their attitude towards overweight. The results might have been different then. In the study of O'Brien et al. (2010) they found a relation between prejudice against fat people and the extent to which one believes obesity is controllable, they applied this method and compared the results from before and after the intervention.

Additionally, obesity is a topic where most individuals already have a strong opinion about. Since it is a widely discussed subject in our society, almost every possible reason for the cause of overweight has already passed. This made it possible to already make up your mind about the reason or combination of reasons you believe is mostly linked to the overweight. If someone already possesses one frame, it is difficult to change their mind about a complex matter as this. This is because of phenomena like a confirmation bias and cognitive dissonance (Nickerson, 1998; Harmon-Jones, 2012). Even if the information they receive proves to be scientific, it can be hard to shift their beliefs.

Conclusions

The current study showed that a decrease in perceived lack of willpower will reduce negative attitudes towards overweight and obese people. This means that the less willpower an overweight or obese person gets assigned to by individuals, the more negative their attitude is towards this person with overweight. Moreover, there was a negative correlation found between someone's age or BMI and their perceived lack of willpower and negative attitudes towards overweight people. This indicates that the older you are or the more you weight, the less willpower you believe an overweight individual possesses and the more negative your attitude is towards overweight and obese people.

When comparing the results of the three different conditions to the attitudes of the participants towards overweight and obese people, there was no significant difference found. As well as when focussing on the perceived lack of willpower of overweight and obese people, there was no significant difference

found between the three conditions. This illustrates that it is difficult to change people's beliefs by presenting them a frame about the main cause of obesity. To change the attitude of people towards overweight and obese people, more comprehensive research is needed in which the assets and suggestions of this research are taken into account.

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Appendix: questionnaire



WAGENINGEN UR
For quality of life

Welcome!

This study is organised by the Marketing and Consumer Behavior group of Wageningen University and is part of a BSc project on obesity and overweight in the population.

This questionnaire will take about 7 minutes. If you have any questions, please send me an e-mail (Sanne.Nijsten@wur.nl).

By clicking on the highlighted text below you give your consent to participate in this research and you acknowledge the following:

- I have read and understood the information above and have been given a full explanation of my duties as participant and the likely duration of this study.
- I understand that participation in this study involves filling in the following questionnaire.
- I understand that all personal data relating to my participation in this study is held and processed in the strictest confidence.
- I understand that I am free to withdraw from this study at any time without the need to justify my decision and without prejudice.

I herewith confirm that I have read and understood the above information and voluntarily agree to take part in this research



WAGENINGEN UR
For quality of life

At the next page, you will find a text about overweight and obesity in our society. Please read this text carefully.

Text of the condition with the environmental frame



Overweight and obesity have become a serious problem for our society, since half of the adults and one in six children are overweight (Organisation for Economic Co-operation and Development, 2017). Moreover, we can expect a continuance of the increase of people with obesity for the next decade.

Being obese has a big impact on life. Excessive weight has for example consequences for your health. It increases your chances of getting different types of cancer, hypertension and osteoarthritis and it lowers the number of healthy years you live and even the number of years you live overall (Meldrum, Morris, & Gambone, 2017).

Scientific research has shown that obesity is mainly caused by environmental factors (e.g. Brownell, Schwartz, Puhl, Henderson & Harris, 2009). We live in an environment where the main focus is on the consumption of calorie- and fat-dense foods. We have easy access to food and unhealthy products are often very cheap. Also the amount and variation of food increased, since we have more food available and there is a bigger product range of unhealthy products than a few decades ago (Sallis & Glanz, 2009). An environment like this with a constant flow of the production and consumption of unhealthy products is also called an obesogenic environment, since highly processed products which contain a lot of sugar can cause obesity (Meldrum, Morris & Gambone, 2017).

In order to reduce obesity, we should make changes in our environment that will help obese individuals to lose weight. We can for example promote the intake of vegetables and fruits or make sure that everyone has access to and can afford healthy products (Sallis & Glanz, 2009).



Text of the condition with the individual choice frame



Overweight and obesity have become a serious problem for our society, since half of the adults and one in six children are overweight (Organisation for Economic Co-operation and Development, 2017). Moreover, we can expect a continuance of the increase of people with obesity for the next decade.

Being overweight has a big impact on life. Excessive weight has for example consequences for your health. It increases your chances of getting different types of cancer, hypertension and osteoarthritis and it lowers the number of healthy years you live and even the number of years you live overall (Meldrum, Morris, & Gambone, 2017).

Scientific research has shown that obesity is mainly caused by the kind of products we consume and the amount of exercise we get (e.g. Meldrum, Morris & Gambone, 2017). Consumption of too much products that are high in energy, fat and/or sugar increase the chances of weight gain. Furthermore, too little exercise can also contribute to overweight and obesity. Your energy intake and expenditure should be in balance in order to maintain your current weight (Hill, Wyatt & Peters, 2012). If you eat more calories than you expend, you will gain weight.

In order to reduce obesity, we should help obese individuals to lose weight by supporting them to follow a healthy diet in combination with exercising on a regularly basis (Dahlkoetter, Callahan & Linton, 1979). We have to help individuals to gain a balance between their energy intake and energy expenditure (Hill, Wyatt & Peters, 2012).



Text of the control condition with no frame



Overweight and obesity have become a serious problem for our society, since half of the adults and one in six children are overweight (Organisation for Economic Co-operation and Development, 2017). Moreover, we can expect a continuance of the increase of people with obesity for the next decade.

Being obese has a big impact on life. Excessive weight has for example consequences for your health. It increases your chances of getting different types of cancer, hypertension and osteoarthritis and it lowers the number of healthy years you live and even the number of years you live overall (Meldrum, Morris, & Gambone, 2017).



Please answer as honestly as possible to what extent you (dis)agree with the following statements.

	Very strongly disagree	Strongly disagree	Disagree	Disagree somewhat	Unsure	Agree somewhat	Agree	Strongly agree	Very strongly agree
Few of my friends are overweight or obese.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tend to think that people who are overweight are a little untrustworthy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Although some overweight people must be intelligent, generally I think they tend not to be.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a hard time taking overweight people too seriously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fat people make me somewhat uncomfortable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I were an employer, I might avoid hiring an overweight person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I dislike people who are overweight or obese.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Please answer as honestly as possible to what extent you (dis)agree with the following statements.

	Very strongly disagree	Strongly disagree	Disagree	Disagree somewhat	Unsure	Agree somewhat	Agree	Strongly agree	Very strongly agree
People who weigh too much could lose at least some part of their weight through a little exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some people are overweight because they have no willpower.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is people's own fault if they are overweight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Please answer the following question related to the text you just read.

	Very strongly disagree	Strongly disagree	Disagree	Disagree somewhat	Unsure	Agree somewhat	Agree	Strongly agree	Very strongly agree
The text that I just read about overweight and obesity in our society was credible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



What is your gender?

- Male
- Female

What is your age?

What is your length (in cm)?

What is your weight (in kg)?

What is your nationality?

- Dutch
- Other,

If you have any comments, please leave them below.



We thank you for your time spent taking this survey.
Your response has been recorded.

