The relation between intuitive eating and weight satisfaction

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Abstract

Background

In the Netherlands, obesity rates are increasing at a high pace. One factor that influences people's body weight, is intuitive eating: flexible eating behaviours that are guided by internal hunger and satiety signals. Even though much is known about the relation between intuitive eating and Body Mass Index (BMI), which is an objective measure of body weight status relative to height, the relation between intuitive eating and weight satisfaction, a subjective measure of body weight, has been much less examined. It is important to understand this relation, because increased weight satisfaction has many health benefits, including a lower BMI, a smaller likelihood of developing an eating disorder, and a more positive attitude towards food and eating. Therefore, the research question is: "Is there a relationship between intuitive eating and weight satisfaction?" It is also examined whether BMI mediates this relationship.

Methods

A survey was conducted during seven days among men and women between 16 and 26 years old. The survey measured intuitive eating (using the Multidimensional Internally Regulated Eating Scale), BMI (calculated from participant's self-reported height and weight), and weight satisfaction. There were 148 valid responses, of which 52 men and 96 women. Correlation and regression analyses were conducted to determine the relations between intuitive eating, BMI and weight satisfaction.

Results

No relation was found between intuitive eating and BMI ($\beta = .066$, $p = .423$). However, weight satisfaction was significantly predicted by BMI ($\beta = -.394$, $p < .001$), and by intuitive eating ($\beta = .500$, $p < .001$). After a mediation analysis, the effects of both intuitive eating and BMI on weight satisfaction remained statistically significant. Intuitive eating and BMI together accounted for 38.1% of the variance in weight satisfaction.

Discussion

A moderate positive relation was found between intuitive eating and weight satisfaction. When controlling for BMI, this effect remained statistically significant. Thus, BMI could not fully explain the relation between intuitive eating and weight satisfaction. No association was found between intuitive eating and BMI, however, a weak-to-moderate negative relation was found between BMI and weight satisfaction.

Since intuitive eating increases people's weight satisfaction, people could be taught to increase or develop intuitive eating behaviours. It is especially useful to teach this to children, since they are likely to hold onto this behaviour as they grow up (Eneli, Crum, & Tylka, 2008). This could result in less restrictive eating, which may possibly decrease the number of people with eating disorders. In future research, it would be interesting to examine whether the same positive relation between intuitive eating and weight satisfaction also exists for adults older than 26.

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1. Introduction

In 1981, 37% of Dutch adult males were overweight, compared to 51% in 2004. For females, the prevalence of overweight increased from 30% to 42% between 1981 and 2004. The number of people with overweight and obesity increases in all population groups in the Netherlands (Schokker, Visscher, Nooyens, Van Baak, and Seidell, 2006). The total of overweight people in the Netherlands has grown from 35% in 1990 to 50,2% in 2016 (Centraal Bureau voor de Statistiek, 2017). Being overweight has many negative mental and physical health consequences, and is associated with increased mortality (Carslake, Jeffreys, & Smith, 2016; Petry, Barry, Pietrzak, & Wagner, 2008; World Health Organization, 2000). With regard to overeating, intuitive eating has been shown to be a determinant of a stable and lower body weight (Satter, 2007; Tylka, 2006). Intuitive eating is an eating style that emphasizes increased focus on internal signals of hunger and satiety. People who engage in intuitive eating, have more flexible eating behaviours, which are guided by internal hunger and satiety signals. Intuitive eating is also related to higher levels of enjoyment, more positive associations with food, lower levels of dieting, and less food anxieties (Smith & Hawks, 2006; Tylka, 2006). According to Smith and Hawks (2006), when people have high levels of food anxiety, it means that they worry a lot about food. People who engage in intuitive eating, challenge the 'food police', which refers to internal voices that classify foods to be either 'good' or 'bad' (Healy, Joram, Matvienko, Woolf, & Knesting, 2015).

Much research has been done into intuitive eating and its effects on health. One important health indicator is Body Mass Index (BMI), a measure of weight status (World Health Organization, 2000). Many studies that investigated the relation between intuitive eating and BMI, found a strong negative relation between these concepts (for example: Camilleri et al., 2016). This means that people who engage more in intuitive eating, have a lower BMI than people who engage less in intuitive eating. Even though intuitive eating has been well examined in relation to BMI, which is an objective measure of body weight, there's much less known about its relation to weight satisfaction, which is a subjective measure of body weight. Some studies do examine the relation between intuitive eating and body satisfaction, however, body dissatisfaction differs from weight satisfaction. Body satisfaction is defined as being satisfied with your weight and body shape (Lowes & Tiggemann, 2003). It is therefore a broad concept, consisting of both weight satisfaction, and satisfaction with one's physical appearance. However, a person can be dissatisfied with his/her weight, without having any concerns about his/her appearance. This means that the relation between intuitive eating and weight satisfaction should be considered important. However, there are only a few studies in literature that focus particularly on the relation between intuitive eating and weight satisfaction (for example: Clifford, Keeler, Gray, Steingrube, and Morris, 2010).

It is important to understand this relation, because this will add missing information to literature about whether or not a relation exists between intuitive eating and weight satisfaction. This new information could stimulate research into intuitive eating and weight satisfaction. If, in additional research, it turns out that intuitive eating increases people's weight satisfaction, then intuitive eating interventions can be used to make people more satisfied with their body weight. Increasing people's weight satisfaction has multiple advantages. First, it makes people less likely to engage in dieting behaviours, which prevents BMI increases, and also decreases people's chance of developing eating disorders (Neumark-Sztainer, Wall, Story, & Standish, 2012; Stice, 2002; Stice & Shaw, 2002; Sutin & Terracciano, 2015). Second, it enhances people's eating competence, which means that they develop more positive attitudes towards eating, and that they experience increased levels of food acceptance (Clifford et al., 2010).

This highlights the importance of studying the relation between intuitive eating and weight satisfaction. Therefore, the research question of this study is: "Is there a relationship between

intuitive eating and weight satisfaction?" An answer to this research question will be obtained by conducting a survey among Dutch men and women, aged between 16 and 26. One reason for focusing on young people is that, before the age of 16, parents, schools, and peers have a large influence on adolescent's eating habits (Hermans, De Bruin, Larsen, Mensink, & Hoek, 2017). From 16 years onwards, adolescents start establishing their own eating habits, after which it becomes relevant to stimulate intuitive eating. A second reason for the emphasis on young people is because young people are most vulnerable to body weight concerns and disordered eating (Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2013), which increases their chance of developing an eating disorder (Grave, 2011; Stice, 2002). Decreasing the number of people with eating disorders is very important, since eating disorders put people at a higher risk of developing serious health problems (Lewinsohn, Striegel-Moore, & Seeley, 2000). Therefore, research into weight (dis)satisfaction can best emphasize on people between 16 and 26 years old. This study focuses on both men and women, because it has been found that for both boys and girls, intuitive eating is positively related to body satisfaction (Smith & Hawks, 2006; Tylka & Kroon Van Diest, 2013).

In this research, intuitive eating is the predictive variable, and weight satisfaction is the outcome variable. Intuitive eating will be measured using the Multidimensional Internally Regulated Eating Scale (MIRES) (Palascha, Van Kleef, De Vet, & Van Trijp, under review). Weight satisfaction will be measured by asking the respondents how satisfied they are with their body weight (by using a validated measure by Duong and Roberts, 2016). BMI, which may possibly mediate the relation between intuitive eating and weight satisfaction, will be calculated from respondents self-reported current height and weight. The results of this research have important consequences for theory and practice. New information will become available, which may stimulate new research into the relation between intuitive eating and weight satisfaction. Also, if this relation turns out to be positive, then intuitive eating can be stimulated in order to make increases in BMI and development of eating disorders become less likely.

2. Theoretical background

2.1 The concept of intuitive eating

Adaptive eating is defined as the use of internal hunger and satiety signals to guide one's eating behaviour. The extent to which a person eats adaptively, can be measured by the concept *intuitive eating*, which refers to flexible eating behaviours that are guided by internal hunger and satiety signals, rather than by contextual factors such as situation or emotions (Tylka, 2006). The concept of intuitive eating has three key features. First, the permission to eat when hungry. This feature implies that there are no dietary restraints, so that people can eat whatever they want when they are hungry, not avoiding any type of food. The second feature is that eating behaviours are guided by physical reasons: this means that people eat in response to their physical hunger, rather than to deal with negative affect. Third, people rely on internal hunger and satiety signals. They trust these signals when deciding whether to eat a meal, and what the size of this meal will be. These three features are assessed by the Intuitive Eating Scale (Tylka, 2006). The Intuitive Eating Scale-2 (IES-2), which was developed by Tylka and Kroon Van Diest in 2013, includes a fourth feature of intuitive eating, called body-food choice congruence: this feature implies that people make food choices based on what their body needs. However, there's not enough support for the body-food choice congruence factor. For example, when the concept validity of this factor was evaluated by Camilleri et al. (2015), it was found that the factor requires further development, since it did not coexist very well with the first factor of the IES-2 (unconditional permission to eat). Another measure of intuitive eating, which is conceptualized in a different way, is the Multidimensional Internally Regulated Eating Scale (MIRES) (Palascha et al., under review). This scale also emphasizes on the role of internal hunger and satiety signals with regard to people's eating behaviours, however, it contains less items.

Intuitive eating was developed as a new way to promote a healthy body weight, and as an alternative to dieting. When it was found that dieting did not lower people's weight in the long-term (Bacon, Stern, Van Loan, & Keim, 2005), the concept of intuitive eating was introduced to create a healthier lifestyle for both overweight and normal-weight people. Intuitive eating can thus be seen as an 'anti-dieting approach' that originated as a response to the increased number of people with obesity and/or eating disorders (Smith & Hawks, 2006). Dieting includes many practices that are contradictory to the features of intuitive eating. For example, people who diet may avoid certain types of food, because they believe these are 'bad' foods. In intuitive eating, on the other hand, no foods are avoided and people just eat what they desire at a certain moment. Also, dieters may have to place a limit on how much they eat, meaning that they may stop eating even though they are still hungry, whereas people who engage in intuitive eating are always allowed to eat when hungry. Thus, intuitive eaters use internal hunger and satiety signals to guide their eating behaviour, whereas dieters use cognitive rules (Moy, Petrie, Dockendorff, Greenleaf, & Martin 2013; Tylka, 2006). Intuitive eating is therefore negatively related to dieting: people who eat intuitively, are less likely to diet, and people who engage more in restrictive eating, show less intuitive eating behaviours (Anderson, Reilly, Schaumberg, Dmochowski, & Anderson, 2016; Dockendorff, Petrie, Greenleaf, & Martin, 2012). The disadvantage of dieting is that dieting only has short-term effects on weight loss: in the long-term, weight is often regained (Bacon et al., 2005; Tsai & Wadden, 2005). In a systematic review of weight loss programs in the United States, it turned out that initial weight loss is often high, but after a few years, almost all weight is gained back (Tsai & Wadden, 2005). Other studies showed that weight may even increase due to dieting. This can be explained by using eating disorders as mediator: people who diet, are more likely to develop an eating disorder, which in turn may result in weight gain (Anderson et al., 2016; Patton, Selzer, Coffey, Carlin, & Wolfe, 1999). Smith and Hawks (2006) conducted a survey among students, that assessed their attitude towards food and eating, and their eating behaviour. They found that for chronic dieters, the pleasure of eating may be lost, after which dieters experience lower levels of psychological well-being, and higher levels of food anxiety (increased worrying about food). Lastly, dieting promotes certain behaviours that

characterize eating disorders, such as vomiting (Stice, 2002). A three-year cohort study has been done in Australia, which included more than 2000 students. In this study, it was found that females who follow a strict diet, are eighteen times more likely to develop an eating disorder, compared to females who do not diet. Dieting was described as the number one predictor of eating disorders among women (Patton et al., 1999).

One concern with intuitive eating is that it may lead to a lower quality diet. Besides, it has also been stated in literature that restrictive eating may enhance the quality of people's diet. For example, Ptomey et al. (2016) have shown that a weight loss intervention that uses low-calorie meals in fixed serving sizes, increases the quality of the participant's diet. However, their food intake was self-reported, implying that the results may not be reliable, since participants could have lied about what they ate (Ptomey et al., 2016). Furthermore, Smith and Hawks (2006) have shown that intuitive eating does not lower the quality of people's diet. Therefore, intuitive eating appears to be a good alternative to dieting, in promoting a healthy weight.

In literature, intuitive eating has been examined in relation to many concepts. First, it was shown that intuitive eating is positively related to self-esteem, optimism, and pro-active coping (Tylka, 2006). Pro-active coping is defined as a type of anticipatory coping: before a stressful event may happen, people try to prevent or modify it (Aspinwall & Taylor, 1997). A second concept that intuitive eating has often been associated with in literature, are exercise motives. Multiple studies have shown that higher levels of intuitive eating are linked to internal exercise motives, rather than external exercise motives such as appearance motives (Gast, Nielson, Hunt, & Leiker, 2015; Tylka & Homan, 2015). A study by Avalos and Tylka (2006) shows the same relation, however, they did not focus on exercise, but rather on body acceptance by others. By taking questionnaires from female students, they created an acceptance model of body appreciation and intuitive eating. This model displays that body acceptance by others creates more favourable body attitudes, resulting in larger body appreciation (Avalos & Tylka, 2006; Tylka, 2006). When women appreciate their body, they focus on functional body aspects rather than on their appearance, which enhances intuitive eating behaviours (Avalos & Tylka, 2006). Thus, the less focus on appearance, the greater the level of intuitive eating. However, a study by Moy et al. (2013) shows different results. In this study, it was found that appearance motives for exercise are related to increased levels of intuitive eating, because exercising may serve as a means to deal with stress and negative affect. Thus, when someone experiences a negative mood, he/she may cope with it by exercising, rather than by emotional eating (Moy et al., 2013). A third factor that has frequently been related to intuitive eating, is happiness. People who engage in intuitive eating, experience greater levels of happiness and are more satisfied with their lives, than those who do not engage in intuitive eating (Dockendorff et al., 2012). Intuitive eating thus positively affects people's well-being. The fourth concept that is associated with intuitive eating, is emotion. Dockendorff et al. (2012) found that people who engage more in intuitive eating, experience positive rather than negative emotions. This means, for example, that people with intuitive eating habits are more likely to be happy than sad. Lastly, intuitive eating is related to higher enjoyment of food and less food anxieties (Smith & Hawks, 2013). People who engage more in intuitive eating, experience more pleasure of eating, and worry less about food.

Thus, intuitive eating is linked to many important factors, including self-esteem, optimism, proactive coping, exercise motives, happiness, emotions, food enjoyment, dieting and eating disorders. Two other factors that intuitive eating is associated with, are BMI (an objective measure of body weight) and weight satisfaction (a subjective measure of body weight). Much research has been done into the relation between intuitive eating and BMI, however, not all studies show the same results (see paragraph 2.2). There has also been research into the relation between BMI and weight satisfaction, however, there are much less studies that examine the relation between intuitive eating and weight satisfaction (see paragraph 2.3). The next two paragraphs will describe what is known and unknown about the relations between these three variables.

2.2 Intuitive eating and BMI

The less people engage in intuitive eating behaviours, the higher their levels of restrictive eating or dieting (Anderson et al., 2016; Dockendorff et al., 2012). Dieting is related to long-term increases in BMI (Neumark-Sztainer et al., 2012; Siahpush et al., 2015). This means that people who diet more, in general have a higher BMI than those who diet less. Conversely, higher levels of intuitive eating are related to lower body weight (Camilleri et al., 2016; Smith & Hawks, 2006; Tylka, 2006; Tylka & Kroon Van Diest, 2013). However, a study by Bacon et al. (2005) shows other results. In this study, a sample was identified of obese women that were dieting in the past. This sample was split into two groups, of which one group received an intervention that increased intuitive eating, whereas the other group was stimulated to engage in restrictive eating. People in the intuitive eating group did not lose weight, however, they did improve on certain health indicators, such as having reduced cholesterol: these results remained after two years. People in the restrictive eating group had the same cholesterol levels than before the intervention, but they did lose weight. However, after two years, this decrease in body weight was no longer significant (Bacon et al., 2005). Thus, in this study, no relation was found between intuitive eating and BMI, contradicting the results of most other studies.

Intuitive eating is an eating style that can be taught to young children, and that influences children's BMI. One model that explores the relation between intuitive eating among children, and their BMI, is the trust model. The trust model emphasizes the caregiver's trust in the ability of children to self-regulate their food intake. This way, children learn to trust that they can eat what and when they want, rather than being taught to restrict their portions and pay attention to calories. When children learn to engage in intuitive eating, they are more likely to have a lower BMI, compared to children who are taught to restrict their food intake (Eneli et al., 2008). This result adds to the pile of evidence that there exists a negative relation between intuitive eating and BMI. It may be beneficial to teach children intuitive eating habits, since children are likely to stick to these habits when they get older (Eneli et al., 2008).

However, according to research by Duong and Roberts (2016), there are differences between people's real body weight, and their perceived body weight or the extent to which they accept their weight. People's perceived body weight may be more important in predicting their eating behaviours, compared to BMI. The acceptance model by Avalos and Tylka (2006) shows that when someone perceives their body to be accepted by others, it makes them appreciate their own body to a larger extent (independent of their real body weight), which enhances intuitive eating behaviours. Thus, the perception of an individual that his/her body weight is accepted by others, rather than their BMI, predicts intuitive eating behaviours. Also, people's self-perceived body weight is found to be a more important predictor of overweight and obesity later in adolescent's life, than BMI (Duong & Roberts, 2014). Duong and Roberts (2014) have done a cohort study including 2445 adolescent boys and girls. They have shown that adolescents who think they are overweight, have a higher chance of becoming overweight or obese later in life, compared to adolescents who think that they have an average weight. There are other studies that found the same relation (Cuypers et al., 2012). Therefore, besides focusing on BMI, which is an objective measure of body weight, the focus will also be on weight satisfaction, which is a subjective measure of body weight. Weight satisfaction will be explored in relation to BMI, and in relation to intuitive eating.

2.3 Weight satisfaction

Body satisfaction refers to satisfaction with your weight and body shape (Lowes & Tiggemann, 2003). Body satisfaction thus consists of both weight satisfaction, and satisfaction with one's physical appearance. However, one can be dissatisfied with one's weight, but at the same time not have any concerns about ones physical appearance. Therefore, it is important to pay attention to the concept of weight satisfaction. However, there is not much literature about weight satisfaction in relation to BMI or intuitive eating. Even though body satisfaction and weight satisfaction are two different

concepts, a lot can be learned about the potential relation between intuitive eating and weight satisfaction, by looking at the relation between intuitive eating and body satisfaction.

Bucchianeri et al. (2013) found that body dissatisfaction increases when children age, starting from early adolescence into young adulthood, and levelling off when people get further into adulthood. This holds for both men and women, however, men report lower average levels of body dissatisfaction than women. It is confirmed by multiple studies that body dissatisfaction is highest among women in early and middle adolescence, and that it decreases when they reach middle adulthood (Bearman et al., 2006; Mustapic, Marcinko, & Vargek, 2015). Higher levels of body dissatisfaction during adolescence may be explained by the beauty ideal that is posed by society, or by the increasing amount of body fat during puberty (Hoffmann & Warschburger, 2017). Even though men are often assumed to have muscularity concerns rather than weight concerns, adolescent boys still have weight concerns, which contribute to body dissatisfaction (Hoffmann & Warschburger, 2017; Jones, Bain, & King, 2008). According to Davison, Markey, and Birch (2000), increased weight concerns are also related to higher body dissatisfaction among girls. On average, men engage more in intuitive eating than women, and show less dieting behaviours than women (Smith & Hawks, 2006). However, for both men and women, there is a positive relation between intuitive eating and body satisfaction. Also, for both sexes, intuitive eating has a strong negative relation with BMI (Smith & Hawks, 2006; Tylka & Kroon Van Diest, 2013).

BMI and body satisfaction

The results of a study by Hoffmann and Warschburger (2017) show that weight dissatisfaction is positively related to BMI: the larger people's weight dissatisfaction, the higher their body weight. BMI is also associated with *body* dissatisfaction: for women, increases in BMI result in higher body dissatisfaction. However, this relation was not found for men (Bearman, Presnell, Martinez, & Stice, 2006). Many other studies did find, for both men and women, that a higher BMI is associated with a higher level of body dissatisfaction (Hausenblas, Symons Downs, Fleming, & Connaughton, 2002; Mustapic et al., 2015; Tiggemann & Lynch, 2001).

Since weight satisfaction is an important part of body satisfaction, the negative relation that exists between BMI and *body* satisfaction, is expected to also exist between BMI and *weight* satisfaction. The higher people's BMI, the less satisfied they will be with their weight. Since BMI is also related to intuitive eating (Camilleri et al., 2016; Smith & Hawks, 2006; Tylka, 2006; Tylka & Kroon Van Diest, 2013), BMI may mediate the relation between intuitive eating and weight satisfaction. In other words, increased levels of intuitive eating may lead to a lower BMI, which in turn results in greater weight satisfaction.

However, a study by Davison et al. (2000) shows contrary results. Their research did indicate that for girls, higher BMI is related to higher body dissatisfaction, which in turn is related to increased concerns about body weight. However, BMI was not significantly associated with weight concerns (weight dissatisfaction), implying that BMI may not mediate the relation between intuitive eating and weight dissatisfaction (Davison et al., 2000). There's more evidence that indicates that BMI may not mediate this relation. According to Clifford et al. (2010), competent eaters are those who enjoy the food that they desire, and who eat based on internal hunger and satiety signals. Competent eaters are thus largely similar to people who engage in intuitive eating. It was found that competent eating (or intuitive eating) can be predicted by body weight satisfaction, but not by BMI (Clifford et al., 2010). This indicates that people's perceived body weight is more important in relation to intuitive eating behaviours than their BMI. One more disadvantage of BMI as a mediator lies within the measure itself: BMI is not a good measure of overweight or obesity, because it does not make a distinction between fat mass and fat-free mass. This means that athletes, who carry a relatively high amount of muscle mass, are often incorrectly classified as being overweight (Racette, Deusinger,

Strube, Highstein, & Deusinger, 2005). Therefore, the direct relation between intuitive eating and weight satisfaction, without BMI as a mediator, will also be examined.

Intuitive eating and body satisfaction

Body satisfaction can be enhanced by intuitive eating. A positive relation between intuitive eating and body satisfaction has been found by Tylka and Homan (2015), however, whereas this relation was statistically significant for women, it was not significant for men. The same relation was found in a study among women by French, Perry, Leon, and Fulkerson (1995). In other studies (Dockendorff et al., 2012; Linardon & Mitchell, 2017), it was shown that the positive relation between intuitive eating and body satisfaction holds for both men *and* women. Why intuitive eating leads to greater satisfaction with body weight and shape, can be explained by looking at the opposite of intuitive eating: restrictive eating. Restricting yourself in what you are allowed to eat, comes with frustration, which results in higher body dissatisfaction (Bearman et al., 2006). Higher body dissatisfaction, in turn, increases restrictive eating behaviours (Chithambo, 2018; Mustapic et al., 2015). This creates a never-ending circle. Intuitive eating, on the other hand, will make people feel better about the way they look, which in turn makes them trust their internal hunger and satiety signals to a larger extent, again increasing intuitive eating behaviours (Dockendorff et al., 2012).

Since weight satisfaction is an important part of body satisfaction, the same positive relation that is found between intuitive eating and *body* satisfaction, is expected to exist between intuitive eating and *weight* satisfaction. The more people engage in intuitive eating, the more satisfied they will be with their body weight.

2.4 Conceptual model and hypotheses

Based on the literature and argumentation described above, it is expected that increased levels of intuitive eating will result in greater weight satisfaction (Dockendorff et al., 2012; Linardon & Mitchell, 2017; Tylka & Homan, 2015). BMI may mediate this relationship. It is expected that increased levels of intuitive eating will result in a lower BMI (among others: Camilleri et al., 2016; Neumark-Sztainer et al., 2012; Smith & Hawks, 2006). A lower BMI, in turn, is expected to result in increased levels of weight satisfaction (among others: Hausenblas et al., 2002; Hoffmann & Warschburger, 2017; Mustapic et al., 2015).

In short, three hypotheses will be tested:
H1: The more an individual eats in an intuitive way (as indicated by a higher score on the MIRES scale), the greater the weight satisfaction of that individual.
H2: The more an individual eats in an intuitive way (as indicated by a higher score on the MIRES scale), the lower the BMI of that individual.
H3: The lower the BMI of an individual, the greater the weight satisfaction of that individual.

The conceptual model is shown in figure 1.

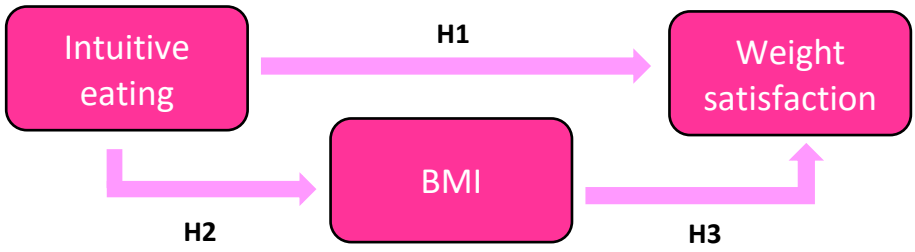

Figure 1: Conceptual model showing the relationship between intuitive eating and weight satisfaction for Dutch males and females between 16 and 26 years old, with BMI being a potential mediator in this relationship.

3. Methods

3.1 Participants

In total, there were 170 responses. After removing the data of participants who did not belong to the target group, or who did not fill in all questions, 148 participants remained, of which 52 men (35.1%) and 96 women (64.9%). The participants had ages ranging from 17 to 26 (M = 21.2, SD = 2.1), covering almost the whole target group. For most participants, HAVO/VWO or HBO/WO was the highest education that they had completed (51.4% and 37.2%, respectively). From participants height and weight, their BMI values were calculated, which ranged from 16.8 to 34.6 (M = 22.5, SD = 3.2).

3.2 Procedures

Data was collected with a questionnaire, using the online program *Qualtrics*. The questionnaire was distributed among the target group (men and women aged 16 to 26) through personal messages and social media, and data was collected during seven days. After filling in an informed consent form, participants had to answer twelve questions. People could voluntarily fill in the questionnaire. To stimulate responses, participants could win a gift card worth €10,- if they filled in their email address at the end. The questionnaire was administered in Dutch, because this was expected to enhance the respondent's understanding of the questions, resulting in more reliable answers. In the questionnaire (see appendix 1), three core concepts were measured: intuitive eating, BMI, and weight satisfaction.

3.3 Measures

Predictive variable

Intuitive eating was the predictive (independent) variable. The concept of intuitive eating was measured with six items that constitute the MIRES scale (Palascha et al., under review). All items, including their Dutch translations, are included in table 1. Respondents were asked to indicate to what extent they agreed with the six statements. A 7-point response scale was used, with 1 = not at all true, 2 = fairly not true, 3 = a little not true, 4 = neutral, 5 = a little true, 6 = fairly true, and 7 = completely true. Cronbach's alpha of the MIRES scale was equal to .79, meaning that the internal consistency of the items was high. The scale was therefore reliable. Deleting any item from the scale did not largely increase Cronbach's alpha, so it was decided to retain all items.

Table 1: Six items of the MIRES scale and their Dutch translations, which were used in the survey.

Items on the MIRES scale	Dutch translation
I have a general tendency to eat in response to my internal hunger and satiety signals	Over het algemeen eet ik als reactie op lichamelijke signalen van honger van verzadiging
In deciding about eating, I just follow what my body tells me	Bij beslissingen over eten volg ik alleen wat mijn lichaam mij vertelt
I don't make much of an issue out of my eating	Ik maak geen groot probleem rondom eten
I have a carefree eating style	Ik heb een zorgeloze eetstijl
I have a positive and relaxed relationship with food	Ik heb een positieve en ontspannen relatie met eten
I savour my food without any sabotaging thoughts	Ik geniet van mijn eten zonder saboterende gedachten

Outcome variable

Weight satisfaction was the outcome variable. Weight satisfaction was defined as the degree to which a person is satisfied with his/her body weight. Weight satisfaction was measured by asking the respondents how satisfied they are with their body weight. This question was adapted from a validated measure of body satisfaction by Duong and Roberts (2016): they measured body satisfaction by asking the respondents how satisfied they were with their body. This question has

been adapted to measure weight satisfaction. Respondents had to indicate on a scale from one to seven whether the statement "I am satisfied with my weight" was true for them. The response scale contained the answers 1 = not at all true, 2 = fairly not true, 3 = a little not true, 4 = neutral, 5 = a little true, 6 = fairly true, and 7 = completely true.

Mediator
The relation between intuitive eating and weight satisfaction was potentially mediated by BMI. BMI was calculated by asking respondents about their current height in kilograms and their current weight in centimeters. Then, their weight in kilograms was divided by the square of their height in meters to obtain their BMI (Fyler, Schumacher, Banning, & Gam, 2014).

Participant demographics
At the end of the questionnaire, respondents had to fill in their gender and their highest level of education. The educational levels were categorized as follows: primary education, practical education/VMBO, HAVO/VWO, MBO, and HBO/WO This way, it could be established whether the sample contained sufficient men and women, from both lower and higher educational levels. Also, respondents had to fill in their age, so it could be established whether they belonged to the target group or not.

3.4 Data analysis
The collected data was transferred from Qualtrics to SPSS Version 22. Participants who did not belong to the target group, or who did not complete all questions, were deleted from the data set. It was checked whether the number of men and women who participated, were approximately equal, and whether both higher-educated and lower-educated men and women were included. Then, the data was checked for outliers and extreme values. It was also checked whether the variables were normally distributed, with the use of histograms and Q-Q plots. Then, Cronbach's alpha was calculated to see whether the items that were used to measure intuitive eating, formed a reliable scale. All items were then summed up and divided by six, to get an average intuitive eating score for all participants. Furthermore, participant's BMI scores were calculated from their length and body weight.

Next, Spearman's rho was calculated for the relations between intuitive eating, BMI, and weight satisfaction, in order to test all three hypotheses. Then, scatter plots were made to see whether the relations between intuitive eating, BMI and weight satisfaction were linear. A regression analysis was carried out to be able to create a model of the relations between intuitive eating, BMI and weight satisfaction. Lastly, a mediation analysis was done to see whether BMI mediated the relation between intuitive eating and weight satisfaction. A statistical significance level of .05 was used in all analyses.

4. Results

4.1 Normality, outliers and extreme values

All variables were (approximately) normally distributed. One outlier was found for weight in kilograms: one participant weighed 100 kilograms. However, there was no reason to delete this outlier from the data set. No extreme values were found.

4.2 Descriptive statistics

Intuitive eating and weight satisfaction were both measured on a 7-point scale: all answers on the scale were used at least once. Therefore, for both these concepts, the minimum value was 1 and the maximum value was 7. For intuitive eating, the mean was 4.7, and for weight satisfaction, the mean was 4.5. A moderate, positive relation was found between intuitive eating and weight satisfaction. Intuitive eating was not related to BMI, however, a moderate, negative relation was found between BMI and weight satisfaction. Table 2 shows the correlations between intuitive eating, BMI, and weight satisfaction, and their significance levels.

Table 2: Means and standard deviations of intuitive eating, BMI and weight satisfaction, and the correlations between these concepts, including their statistical significance levels

	Mean	**SD**	**1**	**2**	**3**
1. Intuitive eating	4.7*	1.2			
2. BMI	22.5	3.2	r = -.047 p = .568		
3. Weight satisfaction	4.5*	1.9	r = .447 p ≤ .001	r = -.328 p ≤ .001	

*Measured on a 7-point scale

4.3 Intuitive eating, BMI and weight satisfaction

A first regression analysis showed that intuitive eating significantly predicted weight satisfaction (β = .500, p ≤ .001), with intuitive eating being able to explain 25% of the variance in weight satisfaction (R^2 = .25). Hence, H1 was confirmed. A second regression analysis has shown that the effect of intuitive eating on BMI was not statistically significant (β = .066, p = .423). Intuitive eating was not at all predictive of BMI (R^2 = .004), and therefore, H2 was rejected. A third regression analysis showed that BMI significantly predicted weight satisfaction (β = -.394, p ≤ .001). R squared was equal to .155, indicating that BMI predicts 15.5% of variation in weight satisfaction. Thus, H3 was confirmed. A mediation analysis was then conducted to establish whether the relation between intuitive eating and weight satisfaction was mediated by BMI: a regression analysis was done with both intuitive eating and BMI as independent variables, after which the effects of both variables remained statistically significant. Therefore, BMI did not mediate the relation between intuitive eating and weight satisfaction. Intuitive eating and BMI together accounted for 38.1% of variance in weight satisfaction (R^2 = .381). These results are visualized in figure 2.

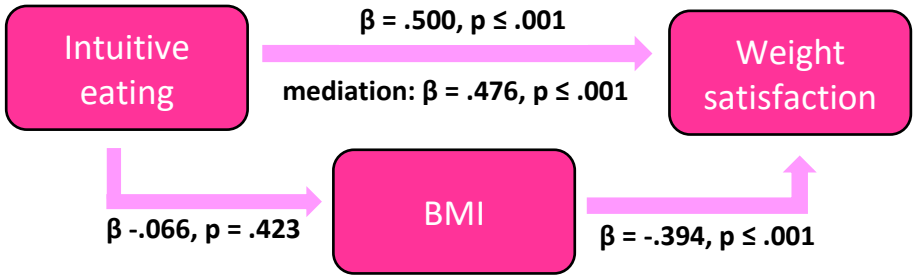

Figure 2: Conceptual model showing the relationship between intuitive eating, BMI and weight satisfaction, including regression coefficients and statistical significance levels.

5. Discussion

5.1 Differences and similarities between the study results and existing literature

Intuitive eating refers to flexible eating behaviours that are guided by internal hunger and satiety signals. In this research, it was examined whether there is a relationship between intuitive eating and weight satisfaction, and whether this relationship is mediated by BMI. Supporting previous research, a positive relation was found between intuitive eating and weight satisfaction (Dockendorff et al., 2012; Linardon & Mitchell, 2017; Tylka & Homan, 2015). The more a person engages in intuitive eating behaviours, the larger his/her weight satisfaction. This makes sense, because higher levels of intuitive eating means lower levels of dieting (Anderson et al., 2016), and when people diet less, they will also experience less weight fluctuations, making them less concerned about their weight (French et al., 1995). When controlling for BMI, the relation between intuitive eating and weight satisfaction remained statistically significant. This means that BMI did not mediate this relationship.

A statistically significant negative relation was found between BMI and weight satisfaction: when people's BMI increases, their level of weight satisfaction decreases. This result matches existing literature (Hausenblas et al., 2002; Hoffmann & Warschburger, 2017; Mustapic et al., 2015; Tiggemann & Lynch, 2001). However, it does contradict the results of a study by Davison et al. (2000), who has found that there is no statistically significant association between BMI and weight dissatisfaction. This difference could be explained by the fact that Davison et al. (2000) examined this relationship among 5-year old girls, whereas the other studies (including this study) focused on either adolescents or adults. This age difference may account for the dissimilar results. Intuitive eating and BMI together explained 38,1% of the variance in weight satisfaction. This implies that other factors also play a role in people's weight satisfaction. A person's BMI and his/her level of intuitive eating thus only partly predict this person's satisfaction with his/her body weight. One other possible predictor of weight satisfaction is body acceptance by others: the more a person feels like his/her body is accepted by others, the more this person will appreciate his/her body and therefore also his/her body weight (Avalos & Tylka, 2006).

One result that was not expected, was that there was no association between intuitive eating and BMI. BMI did not mediate the relation between intuitive eating and weight satisfaction, meaning that it cannot explain this relationship. This contradicts many studies that found a statistically significant negative relation between intuitive eating and BMI (among others: Camilleri et al., 2016; Eneli et al., 2008; Tylka & Kroon Van Diest, 2013). However, these studies included more than 1000 participants, resulting in larger variation in BMI. A lack of variation in BMI in this study, due to the young and relatively slim participants, may explain why no statistically significant relation was found between intuitive eating and BMI.

5.2 Strengths and limitations

Although the relations between intuitive eating and weight satisfaction, and between BMI and weight satisfaction are only moderate or weak-to-moderate, they are still significant. The fact that statistically significant relations are found, is one major strength of this research. Another strength was that the target group (men and women aged 16 to 26) was very well represented in the sample, because for both men and women, there were at least 50 participants. Also, almost all ages included in the target group, were present in the sample, except for the age of 16. A third strength was that the MIRES scale, which was used to measure intuitive eating, had large internal consistency reliability. This means that we have measured what we wanted to measure, namely, people's level of intuitive eating.

One limitation of this study is that height and weight were self-reported. This means that participants could have given socially desirable answers, for example by underreporting their weight (self-

reporting bias) (Hill & Roberts, 1998). This may have influenced the BMI values that were calculated from participant's height and weight, giving a false image of their real BMI's. Moreover, BMI itself is not a good measure of overweight (Racette et al., 2005), however, taking into account the short duration of this research, it was the best possible measure of overweight. One other limitation is that participants were recruited through social media and personal networks, which is a form of convenience sampling. It could be the case that those who participated, had different attitudes toward eating, compared to other people in the same age group. This implies that the results cannot be generalized across the whole target population, threatening the external validity of the study. Also, most participants were highly-educated, so the results cannot be generalized across people in all educational levels. However, under the conditions of this research, convenience sampling was the most suitable, because of its cost effectiveness, time effectiveness and simplicity. A third limitation is that this research was cross-sectional. Therefore, we cannot determine which variable in a relationship is the cause and which is the effect. However, the statistically significant relationships that were found, may stimulate new research that does aim to establish causality. One final element that should be taken into consideration, is that the MIRES scale was used to measure intuitive eating, and that other results could possibly have been obtained if the Intuitive Eating Scale (IES) or the Intuitive Eating Scale-2 (IES-2) were used. Even though all three scales measure the same concept, the IES and IES-2 consist of more and different items than the MIRES scale, which can result in different outcomes with regard to intuitive eating levels.

5.3 Implications for research and practice

In this study, a moderate positive relation has been found between intuitive eating and weight acceptance, and a weak-to-moderate negative relation has been found between BMI and weight acceptance. However, more research is needed. For example, the same research could be repeated with a much larger number of participants, recruited by random sampling. It would be ideal if height and weight are then measured by the researcher, to prevent the self-reporting bias. It would also be interesting to examine whether the positive relation between intuitive eating and weight satisfaction exists for adults as well. Since intuitive eating increases adolescent's weight satisfaction, adolescents should be taught to increase or develop intuitive eating behaviours. This could result in less restrictive eating, which in turn may decrease the number of adolescents with eating disorders. It is important to decrease eating disorder occurrence among adults too, since eating disorders may result in serious health problems (Lewinsohn et al., 2000). Therefore, the relation between intuitive eating and weight satisfaction should be examined among adults as well.

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Appendix 1: Questionnaire

The questionnaire consists of twelve questions, and contains both closed and open ended questions. The questionnaire is shown below:

Eetstijl
Deze vragenlijst gaat over je eetstijl, en duurt maar een paar minuutjes om in te vullen. Als je aan het eind je email-adres invult, maak je kans op een cadeaubon naar keuze ter waarde van 10 euro!

De resultaten worden volledig anoniem verwerkt. Door deze vragenlijst in te vullen ga je ermee akkoord dat de verstrekte gegevens worden gebruikt in wetenschappelijk onderzoek. Je kunt op elk moment stoppen met het invullen van de vragenlijst. Voor vragen kan je me mailen op moniek.bartelds@wur.nl.

1. In hoeverre zijn de volgende stellingen waar voor jou?

- Over het algemeen eet ik als reactie op lichamelijke signalen van honger van verzadiging
- Bij beslissingen over eten volg ik alleen wat mijn lichaam mij vertelt
- Ik maak geen groot probleem rondom eten
- Ik heb een zorgeloze eetstijl
- Ik heb een positieve en ontspannen relatie met eten
- Ik geniet van mijn eten zonder saboterende gedachten

Schaal van 1 tot 7, met 1 = helemaal niet waar, 2 = redelijk niet waar, 3 = een beetje niet waar, 4 = neutraal, 5 = een beetje waar, 6 = redelijk waar, en 7 = helemaal waar

2. In hoeverre is de volgende stelling waar voor jou?

- Ik ben tevreden met mijn gewicht

Schaal van 1 tot 7, met 1 = helemaal niet waar, 2 = redelijk niet waar, 3 = een beetje niet waar, 4 = neutraal, 5 = een beetje waar, 6 = redelijk waar, en 7 = helemaal waar

3. Wat is je lengte in centimeters?
- (open vak)

4. Wat is je gewicht in kilo's?
- (open vak)

5. Wat is je geslacht?
- man
- vrouw

6. Wat is je leeftijd?
- (open vak)

7. Wat is je hoogst afgeronde opleiding?
- basisonderwijs
- praktijkonderwijs/vmbo
- havo/vwo
- mbo

- hbo/wo

Als je nog opmerkingen hebt, mag je die hier invullen. Zo niet, ga dan verder naar het volgende scherm.
- (open vak)

Dankjewel voor het invullen van de vragenlijst. Als je kans wil maken op de cadeaubon, vul dan hieronder je email-adres in. De winnaar krijgt binnen 2 weken bericht. Voor vragen kan je me mailen op moniek.bartelds@wur.nl. Ook mag je me hierop een bericht sturen als je de resultaten van het onderzoek wilt ontvangen.
- (open vak)