

# **Imagery Rescripting focusing on Mastery and Compassion in Eating Disorders with Perfectionism as Moderator**

Masterthesis (SOW-MPSGP90)

M. Dechering, s1001000

Master Healthcare Psychology

Faculty of Social Sciences, Psychology

Radboud University Nijmegen

Supervisor: F. Kadriu

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## Abstract

The study at hand used an adapted version of the Imagery Rescripting (=ImRs) protocol by Arnzt and Weertman to examine the differential effects of ImRs inducing self-compassion or self-mastery on negative core beliefs and eating disorder (=ED) symptoms. Furthermore, the moderating role of clinical perfectionism has been investigated. Twenty-one women at risk to develop an ED participated in this study. They were randomly assigned into either self-compassion group (N=13) or self-mastery-group (N=8). Negative core beliefs and eating disorder symptoms were assessed before and after the ImRs intervention. The results have shown a significant time effect regarding ED symptoms and negative core beliefs and a non-significant time x group effect, meaning that both groups had a decrease in negative core beliefs and ED symptoms at follow up, regardless of in which group they were in. Differential effects of self-compassion or self-mastery cannot be observed. Furthermore, a non-significant time x group x perfectionism effect was found for ED symptoms and negative core beliefs, meaning that perfectionism did not moderate effects.

## Introduction

Eating disorders (EDs) are a group of mental disorders that include pathological eating behaviors such as extreme dieting, binge eating and purging behaviors (American Psychiatric Association, 2013). There is evidence that EDs lead to serious consequences including increased mortality rates, emotional distress, physical morbidity, psychosocial impairment, and decreased quality of life (Fichter & Quadflieg, 2016; Wade et al., 2012; Winkler et al., 2014). The prevalence of EDs in young women aged between 18 and 29 is estimated to be 7.4-8.6% in the Netherlands (van Son et al., 2006). Furthermore, conventional treatment (e.g., Cognitive Behavioral Treatment Enhanced (CBT-E), Fairburn et al., 2003, 2009) are not optimal as reflected by limited response and high rate of relapse after treatment (Cooper et al., 2007). Moreover, a high dropout- rate has been found using CBT for EDs (24%; Linardon et al., 2018). Thus, considering different treatment methods is of high importance.

According to the transdiagnostic model of EDs people with EDs judge themselves mainly based on their shape, weight or eating habits and their ability to control these. In contrast, most people evaluate themselves in terms of their perceived performance in many different aspects of life like the quality of work or relationships (Fairburn et al., 2003). As a result, people with EDs focus highly on their eating pattern, shape and weight using dietary control. The core mechanism behind EDs is thus a dysfunctional system for evaluating self-worth (Fairburn et al., 2003). It is also suggested that core beliefs play a central role in maintaining ED pathology and the dysfunctional scheme for self-evaluation (Cooper et al.,

2007; Fairburn et al., 2003). Core beliefs are deeply held assumptions about ourselves, the world and others and seem to originate from early biographical memory (Beck, 1964). Research shows that women with an ED hold more negative beliefs regarding failure to achieve, worthlessness and abandonment (Cooper et al., 1997; Marshall, et al., 1993). These negative core beliefs often tend to prevent treatment success as they create hopelessness about the ability to change.

Given that negative core beliefs hinder improvement in patients with EDs, research has evaluated other possible intervention methods tackling these beliefs. Recent conventional CBT targets negative core beliefs mainly with verbal techniques, where beliefs are verbally changed into a rational or logical alternative, but this may fail to change them on an emotional level (what one emotionally feels to be true) (Cooper et al., 2007). Instead, imagery-based techniques may be more successful in reducing negative core beliefs as they evoke more emotions. In fact, research shows that imagery has a more powerful impact on emotion than the verbal processing of the same material (Holmes et al., 2008; Holmes & Mathews, 2010). One intervention that makes use of mental imagery is Imagery Rescripting (ImRs).

ImRs is a therapeutic technique that aims to alter core beliefs by recalling an early aversive memory and then changing the content of that memory (Arntz & Weertman, 1999). It makes use of mental imagery and guides the patient to change an aversive memory, with a more positive outcome for the individual (Arntz & Weertman, 1999). The rationale behind ImRs is that it provides a corrective experience of a biographical memory, where unfulfilled needs are met by bringing a trusted adult (e.g., themselves as an adult) into the memory (Arntz & Weertman, 1999). This enables the patient to retrieve positive interoceptive and conceptual information antagonistic to the negative information in the memory, which often leads to a change in the emotional belief (Wells, 2000). By changing the meaning of the important early childhood experience, this method leads to a fundamental change of core beliefs which might then lead to less pathological eating behaviors (Cooper et al., 2007). Another strength of this technique is that it involves exposure and habituation to the memory but is not based on extinction.

In the first phase of ImRs, the patient is asked to imagine a disturbing autobiographical childhood experience as lively as possible in the perspective of the child-self to realize the needs of the child-self. In the second phase, the patient is asked to imagine the scene again as an adult, observing their child-self and to give the child-self everything that it needed in that situation. In the third phase, the patient is asked to take the child's perspective again and to view the intervention he or she received from the adult-self.

Several studies have shown the effects of ImRs on core beliefs and ED symptoms in individuals with disordered eating. A study by Cooper and colleagues (2007) showed that ImRs targeting negative or traumatic autobiographical memories in bulimia nervosa (BN) led to decreased negative emotional self-beliefs and a decrease in the urge to binge. Moreover, another study used online ImRs among young women at risk of developing an ED, which led to higher self-compassion and a reduced risk to develop an ED (Zhou et al., 2020). Therefore, self-compassion is known as protective factor against EDs (Zhou et al., 2020). The same intervention led to less dysfunctional beliefs such as clinical perfectionism and low self-esteem which are risk and maintenance factors for ED (Zhou et al., 2020). Taken together, these studies show some promising results that ImRs has an effect in reducing ED symptoms and core beliefs.

However, working mechanisms of ImRs still remain unclear (Arntz & Weertman, 1999). As noted, it is suggested that ImRs brings a change into the core beliefs by fulfilling one's unmet needs. Two potential strategies to fulfill unmet needs are inducing self-compassion or self-mastery (Arntz, 2012; Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019; Zhou et al., 2020). Self-compassion is defined as having three components: (1) rather than being self-critical, one is kind and understanding toward oneself, (2) the own fallibility is seen as part of being human and (3) painful thoughts and feelings are held in mindful awareness instead of avoiding them (Neff, 2003). Self-compassion is known as a protective factor against EDs. Moreover, inducing self-compassion is known to enhance self-love, which might then lead to the fulfillment of the unmet need of being loved (Zhou et al., 2020). Thus, it is suggested that increasing self-compassion will lead to less negative core beliefs and ED symptoms by fulfilling the unmet need of being loved in the autobiographical memory (Zhou et al., 2020).

Self-mastery involves feelings of being in control (Romano et al., 2020). Many participants appraised an originally distressing memory as being more controllable after completing ImRs, which indicates that ImRs might lead to a reevaluation of aversive autobiographical memory (Strohm et al., 2019). The increase in perceived self-mastery after completing ImRs may be based on asking participants actively to change their autobiographical memory in accordance with their individual needs and to express every behavior that had been inhibited in the original scene (e.g., defending oneself or asking for help; Arntz, 2012). Furthermore, one study showed that perceived self-mastery mediated the beneficial effects of ImRs in patients with nightmare disorder (Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019). Inducing self-mastery is known to enhance feelings of control,

which might then lead to the fulfillment of the unmet need of being in control (Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019). Thus, it is suggested that enhancing self-mastery will lead to a decrease in negative core beliefs and eating pathology by fulfilling the unmet need of being in control in the autobiographical memory (Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019). However, no studies so far have compared the effects of these two strategies separately.

Furthermore, evidence and knowledge of for whom ImRs might be effective and what clinical factors might impact the utility of ImRs are missing. One moderator that may influence the effects of ImRs in ED patients might be clinical perfectionism, which is seen as a risk and maintenance factor for EDs (Fairburn et al., 1997). Clinical perfectionism is defined as ‘the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one highly salient domain, despite adverse consequences’ (Shafran et al., 2002; p. 778). A high level of perfectionism is associated with worse treatment outcomes (Wilksch, et al., 2008). According to Bruch (1974), people with ED use their body weight as a concrete source of self-definition and as means to compensate for a lack of clear identity as well as for a feeling of power and competence. Perfectionistic tendencies then lead to a need for control over the body (Slade, 1978). Moreover, clinical perfectionism leads to a tendency to see events, own achievements, and behavior in black and white (Slade, 1978). This in turn leads to a tendency to interpret every behavior or own achievement as a failure, which is anything less than ideal (Slade, 1978). Participants with high perfectionistic tendencies getting instructed to take control of their autobiographical memory might then have the feeling that what they are doing is not good enough or that they do not have enough control. This might counteract the introduction and promotion of self-mastery (Slade, 1978). Thus, high perfectionistic tendencies might influence the effect of ImRs inducing self-mastery given the interpretation biases to see much more failure in their own achievement. On the other hand, a study by Pennesi and Wade (2017) showed that increased self-compassion through ImRs reduces self-criticism. This means that ImRs inducing self-compassion could be helpful especially for patients with high clinical perfectionism.

The first aim of this study is therefore to test and compare the effects of ImRs inducing self-compassion and ImRs inducing self-mastery of negative or traumatic memories in core beliefs and ED symptoms in participants who are at risk to develop an ED. It is hypothesized that inducing both self-compassion and self-mastery will lead to less ED symptoms and less negative core beliefs. Furthermore, it is hypothesized that inducing self-mastery or self-

compassion will be equally effective in reducing ED symptoms and core beliefs as both aim to alter core beliefs by fulfilling an unmet need (Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019; Zhou et al., 2020). The second aim of this study is to examine the moderating effect of clinical perfectionism in the ImRs inducing self-mastery and ImRs inducing self-compassion on negative core beliefs and ED symptoms. It is expected that high perfectionism will lead to less effective intervention using the ImRs inducing self-mastery, given the interpretation biases to see much more failure in their own achievement. In contrast high perfectionism is expected to lead to better treatment outcomes when using ImRs inducing self-compassion, as the individual will be guided to be more self-accepting.

## Method

### Participants

In total 325 Dutch and English-speaking participants filled out the pre-screening. The SONA system of the Radboud University was used to recruit participants for the study, as well as ads on social media platforms (Facebook, Proud2bme). Out of those 325 participants 76 met the criteria and were eligible to participate in the study. Criteria were an EDE-Q score between 2.12 and 4.00 and a BMI above 17.5 (Machado et al., 2014; Mond et al., 2006). However, only 26 participants started the study. During the study five participants dropped out. The data of the remaining 21 females between the age of 20 to 27 years ( $M = 22.57$ ,  $SD = 4.39$ ) were included in the analysis with  $N = 8$  in the mastery condition and  $N = 13$  in the compassion condition. Before participation, all participants gave informed consent.

### Measurements

*Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994)* consists of four subscales: restraint, eating concern, weight concern, and shape concern, with 28 items in total ( $\alpha = .81-.95$ ) (Aardoom et al., 2012). The validity is good ( $r = .96$ ) (Aardoom et al., 2012). The items are rated over the past 28 days on a 7-point Likert scale ranging from 0 (*No days*) to 6 (*Every day*). The total sum score of all the items is taken as an indication for the presence of ED symptoms, with higher scores indicating a higher rate of ED symptoms.

*Eating Disorder Belief Questionnaire (EDBQ; Cooper et al., 1997)* is a self-report questionnaire designed to assess beliefs and assumptions associated with eating disorders. It was used to assess negative core beliefs. It consists of four subscales: negative self-beliefs, acceptance by others, self-acceptance and control over eating. In total, it is made up of 32 statements ( $\alpha = .77-.95$ ) (Bergin & Wade, 2014). The validity is good ( $r = .50-.74$ ) (Bergin &

Wade, 2014). The items are rated on a 100-point Likert scale ranging from 1 (*I do not usually believe this at all*) to 100 (*I am usually completely convinced that this is true*). The total scores are calculated by summing up all items, with higher scores indicating a higher rate of negative core beliefs.

*Early Memory Questionnaire (EMQ; Arntz & Weertman, 1999; Cooper et al., 2007)*

Based on the paper of Arntz and Weertman (1999) and Cooper and colleagues (2007), the EMQ was invented. It is used to assess and identify early autobiographical memory and features a detailed description, perspective, vividness, age as it happened, controllability, self-compassion, emotionality, anxiety, anger, and shame induced by the memory and core beliefs associated with memory. Moreover, the EMQ measures to what extent participants believe and feel the core belief to be true. It consists of 14 questions. Three items can be answered in text (age, description, core belief), nine can be answered on a scale from 0 to 100 (vividness, controllability, self-compassion, anxiety, anger, shame induced by memory, perspective, to what extent participants believe and feel the core belief to be true) and one question can be answered on a scale from -3 to +3 (emotionality).

*Clinical Perfectionism Questionnaire (CPQ; Fairburn et al., 2003)* is a 12-item scale which assesses clinical perfectionism in ED populations as well as in the general population ( $\alpha = .78$ ) (Shu et al., 2020). The validity is moderate ( $r = .31-.65$ ) (Shu et al., 2020).

Participants are asked which areas of their lives are affected by perfectionism other than their eating, weight, or appearance. The items are rated over the past 28 days on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*all the time*). Total scores are the sum of the individual items and range from 12 to 48, with higher scores indicating higher clinical perfectionism.

## **Procedure**

The data collection lasted from April 2021 to May 2021. In the beginning participants that were informed about the present study were asked to give informed consent.

All participants filled in the pre-screening using Qualtrics and those that fulfilled the criteria were invited to a ZOOM meeting by e-mail. One day before their scheduled ZOOM meeting participants filled out a baseline measurement including questions assessing demographic data, CPQ, EDE-Q and EDBQ (Qualtrics). During the ZOOM meeting participants started with an online memory reactivation task to identify an early distressing memory related to the current ED problems and filled out the EMQ (Qualtrics). After that they were randomly allocated to one of the two conditions (ImRs inducing self-mastery or ImRs inducing self-compassion).

Before starting the online intervention, participants had to read information on either self-compassion or self-mastery, including a definition of those concepts and that they are related to less eating behavior problems and body dissatisfaction. The ImRs procedure itself was developed based on the protocol by Arntz and Weertman (1999). During the intervention, the participants listened to verbal-prerecorded instructions which were provided using a YouTube video. Participants first recalled the distressing memory they identified before using the memory re-activation task. After that, they were instructed to close their eyes and to imagine their memory as vividly as possible. Then they were asked to identify the worst part of the image and the feelings it evokes (exposure). In the second part of the intervention, the instructions during the task aimed to help participants alter the meaning associated with the memory by rescripting it. In total, the ImRs intervention took 20 minutes. After the ImRs intervention participants were asked to rate the valence during the exercise from very negative (-3) to very positive (+3).

Moreover, a manipulation check was done, measuring self-mastery by asking: “How controllable do you experience the situation that you just described, on a scale ranging from 0 (*not at all controllable*) to 100 (*very controllable*)?”. Self-compassion in the described memory has been measured by asking “How much compassion about yourself do you feel in the situation you just described, on a scale ranging from 0 (*I do not feel any compassion*) to 100 (*I feel a lot of compassion*)?”. One week after they completed the intervention participants were asked to fill in a follow-up measurement including EDEQ and EDBQ that again measured negative core beliefs and ED-symptoms using Qualtrics.

### *Self-compassion condition*

In the beginning, participants in the self-compassion condition had to read a brief informative text about compassion to introduce them to the construct of self-compassion and to inform them about how to be self-compassionate (Falconer et al., 2014). The text included a definition of self-compassion, and a statement about research data showing that inducing self-compassion may lead to less eating behavior problems and body dissatisfaction. During the self-compassion intervention, participants were first guided to recall the distressing memory they identified earlier in the EMQ. They were instructed to imagine the situation from their younger perspective and as if it was happening right now (first phase). After that, they were guided to enter the situation as their current self and to observe their younger self. Next, they were guided to intervene in the memory, by bringing their more compassionate self in the scene, in a way that would make their younger self feel accepted

and loved (second phase). In the end, participants were asked to take the perspective of their younger self again and to experience the intervention done by their current self. Furthermore, they had the chance to ask for additional interventions if they wanted to (third phase).

### *Self-mastery condition*

In the self-mastery condition, participants were first given a brief informative text on self-mastery. The text included a definition of self-mastery and a statement about research that indicates that there is a link between higher mastery and less eating pathology. After that the ImRs intervention was identical to the ImRs intervention inducing self-compassion, except, participants were guided to intervene in a way, making their younger self feel more in control of the situation and empowered.

### **Data Preparation and Analysis**

The data was collected using Qualtrics. Raw data was exported from Qualtrics to SPSS 27. After that, the total scores for the CPQ, EDE-Q and EDBQ at baseline and EDE-Q and EDBQ at follow up were computed. To assess randomization between groups a t-test has been performed for the continuous variable age and for EDEQ, EDBQ, CPQ and memory characteristics. Normality has been tested for the dependent variables (core beliefs and ED symptoms) using a Shapiro-wilk-test and histograms. Outliers, as well as missing data, have been checked using a histogram and boxplot. No missing data has been identified. Four participants have been identified as outliers. Due to the small sample size, all outliers were included in all analyses. Homogeneity of variance has been tested using a Levene's test. Linearity between the covariate and the dependent variable has been tested using a simple scatterplot. The manipulation check was performed, using an independent sample t-test.

### *Effect of ImRs on ED symptoms and negative core beliefs*

The effect of the different interventions on ED symptoms and core beliefs were analyzed using two repeated measures ANCOVA's. The between-subject factor was ImRs intervention (self-mastery/self-compassion), the within-subject factor was time, and the EDE-Q and EDBQ were the dependent variables. CPQ was added to both analyses as a covariate. Prior to the analyses the variable perfectionism was standardized.

## **Results**

### *Participant baseline characteristics*

Table 1 presents the descriptive statistics of the baseline measurement for the two groups. These include demographic and clinical measures. All baseline group differences were non-significant for age EDEQ, CPQ, EDBQ and memory characteristics.

**Table 1**

*Descriptive statistics for baseline measures in the study.*

Variables	ImRs inducing self-compassion (N=13)		ImRs inducing self-mastery (N=8)		Group differences
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>Demographics</b>					
Age	22.77	2.386	22.25	1.832	t(21) = .581, p = .52
<b>Baseline self-report measures</b>					
EDE-Q	2.81	1.21	2.53	1.12	t(21) = 0.003, p = .58
EDBQ	1243.61	464.84	1054.50	696.20	t(21) = 3.126, p = .51
CPQ	27.76	4.58	27.25	4.36	t(21) = 0.001, p = .80
<b>Memory characteristics</b>					
Age of Memory	11.62	3.070	13.00	7.27	t(21) = 10.457, p = .54
Vividness of Memory	58.46	23.74	63.62	14.66	t(21) = 1.532, p = .58
Emotionality	-1.66	0.88	-1.25	1.23	t(21) = 1.455, p = .42
Anxiety	45.92	29.21	50.75	39.76	t(21) = 1.946, p = .75
Anger	63.69	22.73	52.12	37.77	t(21) = 2.991, p = .38
Shame	59.30	29.77	54.12	45.11	t(21) = 5.360, p = .75

*Note: M = Mean; SD = Standard deviation*

#### *Manipulation check*

To see if the value of self-compassion and self-mastery differed between the groups, a manipulation check has been performed. The results indicated no significant differences between conditions on self-compassion  $t(19) = 1.362, p = .189$  or self-mastery.  $t(19) = 0.749,$

$p = 0.463$ . Table 2 shows the mean values of self-compassion and self-mastery in the respective groups.

**Table 2**

*Mean values of self-compassion and self-mastery in the different groups.*

Variables	ImRs inducing self-compassion (N=13)		ImRs inducing self-mastery (N=8)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-compassion	69.92	25.80	51.25	37.21
Self-mastery	70.92	16.42	64.25	24.58

*Note: M = Mean; SD = Standard deviation*

#### *Effect of ImRs on ED symptoms and core beliefs*

To examine whether the ImRs interventions influenced ED symptoms or core beliefs two repeated measures ANCOVAs were conducted. The condition (self-mastery/ self-compassion) and time (baseline/follow-up) were the independent variables, ED symptoms and core beliefs were the dependent variables. Moreover, to examine whether perfectionism moderated the effects of the ImRs interventions on ED symptoms and core beliefs, perfectionism was added to the two analyses as a covariate.

#### *Intervention effect on ED symptoms with perfectionism as covariate*

The results indicated a main effect of time on ED symptoms ( $F(1,17) = 14.118, p = 0.002, \eta^2 = .454$ ). The effect size indicated by partial eta squared is large. A non-significant effect of condition ( $F(1,17) = 0.26, p = 0.873, \eta^2 = .002$ ) and a non-significant effect of time x group ( $F(1,17) = 0.426, p = 0.523, \eta^2 = .024$ ) has been found. The significant effect of time, the non-significant effect of condition, and the non-significant time x group effect on ED symptoms mean that both types of interventions had a significant effect on ED symptoms but there was no significant difference between the groups (self-mastery vs. self-compassion). A non-significant effect of time x group x perfectionism (Wilks'  $F(1,17) = 0.302, p = 0.590, \eta^2 = .017$ ) on ED symptoms has been found. These non-significant effects mean that

perfectionism did not moderate effects of the ImRs interventions influencing ED symptoms. See *Figure 1* for the direction of effect of clinical perfectionism on eating disorder symptoms.

*Intervention effect on negative core beliefs with perfectionism as covariate*

The results indicated a main effect of time on negative core beliefs ( $F(1,17) = 8.241, p = 0.011, \eta^2 = .326$ ). The effect size indicated by partial eta squared is large. A non-significant effect of condition ( $F(1,17) = 0.116, p = 0.737, \eta^2 = .007$ ) and a non-significant effect of time x group ( $F(1,17) = 0.643, p = 0.434, \eta^2 = .036$ ) has been found. The significant effect of time, the non-significant effect of condition, and the non-significant time x group effect on negative core beliefs mean that both types of interventions had a significant effect on negative core beliefs but there was no significant difference between the groups (self-mastery vs. self-compassion). Furthermore, a non-significant effect of time x group x perfectionism (Wilks'  $F(1,17) = 0.003, p = 0.956, \eta^2 = .000$ ) on negative core beliefs has been found. These non-significant effects mean that perfectionism did not moderate effects of the ImRs interventions influencing negative core beliefs. See *Figure 2* for the direction of effect of clinical perfectionism on negative core beliefs.

At the baseline-measurement, both groups had higher scores on the EDEQ as well as on the EDBQ in comparison to the follow-up measurement. For the detailed means and descriptions see Table 3.

**Table 3**

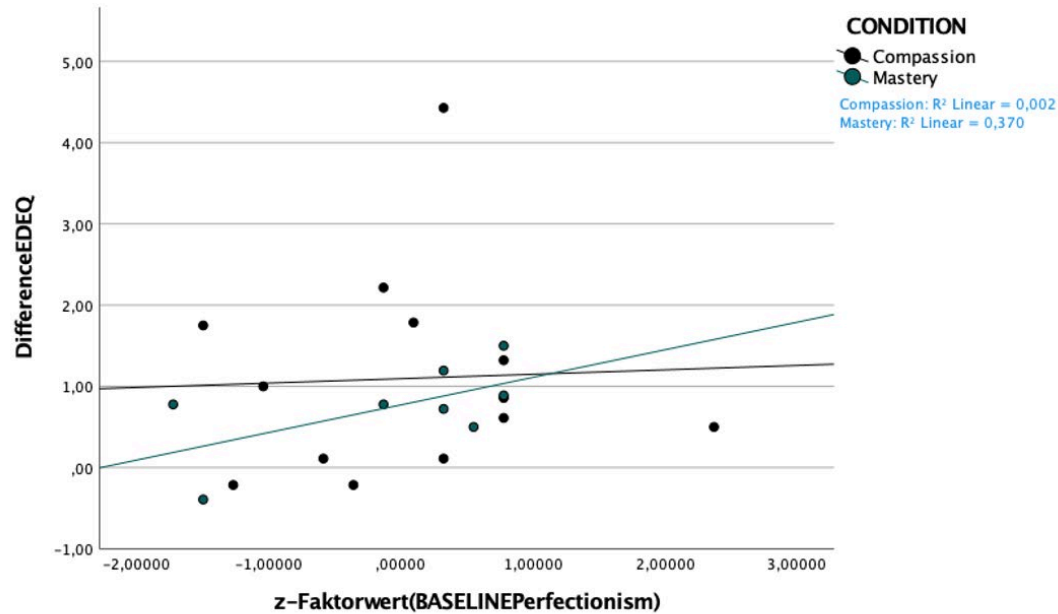
*Mean values of EDEQ and EDBQ at baseline and follow up.*

Variables	ImRs inducing self-compassion (N=13)		ImRs inducing self-mastery (N=8)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>Eating disorder</b>				
<b>Symptoms</b>				
Baseline EDEQ	2.81	1.21	2.53	1.12
Follow up EDEQ	1.72	0.78	1.78	0.70
<b>Core beliefs</b>				
Baseline EDBQ	1243.61	462.84	1054.500	696.20
Follow up EDBQ	893.07	516.00	862.12	642.00

Note:  $M$  = Mean;  $SD$  = Standard deviation

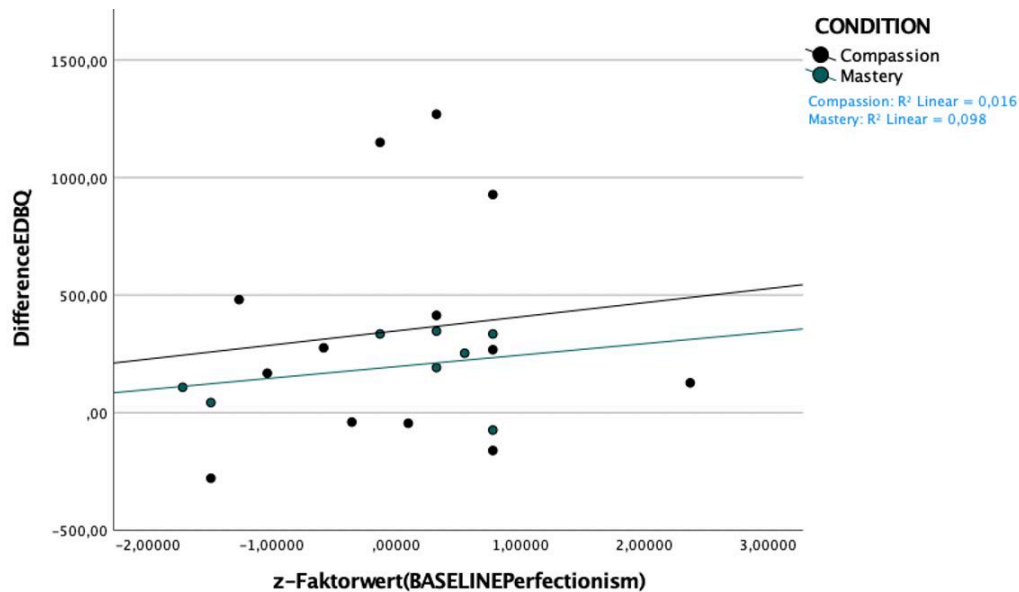
**Figure 1**

*Direction of Effect: Clinical Perfectionism on ED symptoms*



**Figure 2**

*Direction of Effect: Clinical Perfectionism on core beliefs*



## Discussion

The main goal of this study was to test and compare the differential effects of ImRs inducing self-compassion or self-mastery on core beliefs and ED symptoms. Moreover, this

study was used to find out more about possible working mechanisms of ImRs, as well as moderators. Participants at risk to develop an ED were randomly assigned to either the ImRs intervention inducing self-mastery or self-compassion. During the online-intervention participants were asked to rescript an aversive autobiographical memory in a way that should induce feelings of self-mastery or self-compassion. Negative core beliefs and eating disorder symptoms were assessed before and after the ImRs intervention. The results have shown a significant time effect regarding ED symptoms and negative core beliefs and a non-significant time x group effect, meaning that both groups had a decrease in negative core beliefs and ED symptoms at follow up, regardless of in which group they were. Differential effects of self-compassion or self-mastery could not be observed. Furthermore, a non-significant time x group x perfectionism effect was found for ED symptoms and negative core beliefs, meaning that perfectionism did not moderate effects.

The first hypothesis, namely that inducing both self-compassion and self-mastery would lead to less ED symptoms and negative core beliefs is supported. This finding is in line with previous research (Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019; Zhou et al., 2020). Moreover, the hypothesis that both strategies would be equally effective is supported. The current study shows that a relatively short ImRs intervention (20 minutes) can have a beneficial effect on people who are at risk of developing an eating disorder, reducing ED symptoms and negative core beliefs, with a large effect (partial eta squared = .45 for ED symptoms, and .32 for negative core beliefs). According to Arntz & Weertman (2012), during the ImRs intervention, the meaning of an early negative memory related to eating pathology has been changed positively. The meaning has been changed by using the two specific strategies (self-mastery, self-compassion). As a result, the associated negative core beliefs also have been changed which led to reduced ED pathology.

According to Zhou and colleagues (2020) self-compassion is known as a protective factor against EDs. Moreover, inducing self-compassion is known to enhance self-love. As participants were guided to be more self-accepting and self-loving during the intervention, the unmet need of being loved might have been fulfilled. Inducing self-mastery on the other hand is known to enhance feelings of control, which might have led to the fulfillment of the unmet need of being in control in the autobiographical memory (Kunze, Arntz, et al., 2019; Kunze, Lancee, et al., 2019). Consequently, negative core beliefs related to eating pathology have been changed positively by using these two strategies, which led to a reduction in ED symptoms.

However, the manipulation check showed that although participants used different strategies in the respective conditions they still did not differ in the experienced self-compassion or self-mastery during the intervention. A reason for that might be that the sample size is too small. An alternative explanation for these findings is that by taking part in the intervention, inducing one factor (e.g., self-mastery), may also increase the other factor (e.g., self-compassion). As we did not qualitatively check what strategies participants have used, they might have also used other or both strategies during the intervention. Therefore, a differential effect of either self-compassion or self-mastery cannot be observed. This means that you cannot really conclude anything about the differential effect of the two different strategies. This might also be an explanation for the non-significant condition effect that was observed. Future studies should qualitatively look at strategies that participants are using during the intervention to ensure that indeed using various strategies have similar effects on experiencing self-compassion or mastery.

The second aim of this study was to examine the moderating effect of clinical perfectionism in the ImRs inducing self-mastery or self-compassion on negative core beliefs and ED symptoms. The hypothesis that high perfectionism would lead to less effective intervention using the ImRs inducing self-mastery, given the interpretation biases to see much more failure in their achievement, is rejected. Moreover, the hypothesis that high perfectionism would lead to more effective intervention effects using ImRs inducing self-compassion, is also rejected. The results showed non-significant effects of perfectionism on the different ImRs influencing neither ED symptoms nor negative core beliefs.

An explanation for these findings might be that perfectionism does not moderate the effect of ImRs inducing both self-compassion or mastery on ED symptoms and core beliefs. This might mean that the ImRs intervention inducing self-compassion or self-mastery is powerful enough to counteract perfectionistic tendencies. An alternative explanation might be that there was a flooring effect in this study. The CPQ that was used in this study to measure clinical perfectionism shows a range of total scores from 12 to 48, with higher scores indicating higher perfectionism. However, the average score on the CPQ in this study was 27.76 which is quite moderate compared to a clinical sample (Egan et al., 2016). Moreover, the reliability was quite low in this sample (Cronbach's  $\alpha = .50$ ). Thus, it might be that a moderation effect could not be observed in this study as participants showed relatively moderate scores on the CPQ. As clinical perfectionism is seen as a key factor in the transdiagnostic model of EDs (Fairburn et al., 2003), it could be, that higher values on the CPQ would increase the chance of perfectionism moderating the effect of ImRs on ED

symptoms or core beliefs. Future studies should therefore investigate the differences of high versus low clinical perfectionism and its moderating effects on ED symptoms and core beliefs.

Even though the current study and intervention show benefits, there are limitations of this study that need to be considered. First, the sample size of this study is relatively small (N=21). This could have led to flooring effects. Future studies could therefore test this intervention in a different participant group with a greater sample size to assure that effects are not turned down by sample size. Another relevant limitation of this study is that we did not use a control group. Future studies should therefore make use of a control group to ensure that the effects cannot be attributed to spontaneous recovery or a placebo effect. Furthermore, it would be important to examine the clinical relevance of the current study. Therefore, future studies should test the ImRs intervention in a clinical sample, diagnosed with an ED to test the effects on eating pathology. Next, a follow-up measurement after more than one week is needed to test if the effects of the ImRs intervention are long lasting.

To conclude, it can be said that this study contributes knowledge to the development of interventions against eating disorders. The study at hand shows that ImRs interventions can be successful at reducing negative core beliefs and eating disorder symptoms in people who are at risk of developing an eating disorder. If future studies replicate this study using a bigger sample, or a clinical sample and adjust the study as proposed, differential effects can be researched further. Therefore, it should be qualitatively looked at the strategies that participants are using during the intervention. Moreover, the moderating effect of perfectionism could be investigated further, by comparing the effects of high versus low clinical perfectionism.

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## Appendix A

### *Memory re-activation task*

Participants will first be asked to recall a recent episode where they were worried or concerned about their eating, or their body weight/shape. Then they will be invited to think about what goes through their mind in such occasions (e.g., a mix of thoughts and mental images). Focusing their attention on the emotions and sensations associated with the episode they will be asked to image themselves as a child having the same feeling and see whether a spontaneous memory comes in their mind (emotional bridge technique; for more see Arntz & Weertman, 1999). Next, they will be asked to describe the memory in detail. The memory will be rated on emotionality (valence, anxiety, shame and anger), vividness, and vantage perspective.

## Appendix B

### *Script ImRs Intervention inducing self-compassion EN*

^In following, you will start an imagery exercise where you will be asked to recall again the memory you just reported. First, you will be asked to imagine this event and next you will be guided to bring your more compassionate self to intervene in the situation if you want her to.

^^Given that sometimes people struggle to understand what exactly means to be self-compassionate, we will provide some information on compassion

^Being self-compassionate involves.

Validation: The aim of this stage is to acknowledge that the other person is upset, that you do not judge them for this, and that it is perfectly acceptable for them to react in this way;

Redirection of Attention: The aim of this stage is to direct the other person's attention towards something that is more positive, soothing, and comforting.

^^Now, we invite you to recall a memory where someone else was loving and kind to you. Alternatively, you can also remember a memory where you were loving and kind to another person.

^^These memories should include feelings of warmth, comfort and safety. Take your time.  
</page>

<page Information4>

^^Lastly, we want to draw your attention to research findings showing that individuals who are high achievers tend to also score high in self-compassion.

^^Likewise, higher self-compassion is related to less eating behavior problems and body dissatisfaction.

</page>

/ items = ("Could you please let us know what is your current distress level, in a scale from 0 to 10?

Zero indicates that you are experiencing very little to no distress, whereas 10 indicates you are experiencing extremely high level of distress.")

### **Youtube link:**

<https://youtu.be/PIKpB4Nwbvg>

## Appendix C

### *Script ImRs Intervention inducing self-mastery EN*

In following, you will start an imagery exercise where you will be asked to recall again the memory you just reported. First, you will be asked to imagine this event and next you will be guided to bring your more empowered self to intervene in the situation if you want her to.

^^Given that sometimes people struggle to understand what exactly means to have self-mastery, we will provide some information on empowerment/mastery.

</page>

<page Information2>

^Being self-mastery involves.

^(1) Feelings of being in control: The aim of this stage is to increase awareness that you have control over outcomes in your life.

^(2) Action: The aim of this stage is to direct your attention towards taking more active actions to influence the situation and/or toward making more adaptive appraisals of threat and uncertainty.

</page>

<page Information3>

^^Now, we invite you to recall a memory where someone else helped you feel more empowered and in control. Alternatively, you can also remember a memory where you helped another person feel more empowered and in control.

^^These memories should include feelings of empowerment and of control.

</page>

<page Information4>

^^Lastly, we want to draw your attention to research findings showing that individuals who are high achievers tend to also score high in self-mastery.

^^Likewise, higher self-mastery is related to less eating behavior problems and body dissatisfaction.

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<text DistressLevel>

/ items = ("Could you please let us know what is your current distress level, in a scale from 0 to 10?

Zero indicates that you are experiencing very little to no distress, whereas 10 indicates you are experiencing extremely high level of distress.")

/ fontstyle = ("8514oem", 1.33%, false, false, false, false, 5, 1)

/ txcolor = (0, 0, 0)

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Youtube link:

[https://youtu.be/1uryE\\_A9Y\\_I](https://youtu.be/1uryE_A9Y_I)

## Appendix D

### *Script ImRs Intervention inducing self-compassion NL*

^Hierna begin je een beelddoefening waarbij je wordt gevraagd om de zojuist gerapporteerde herinnering opnieuw op te roepen. Eerst wordt je gevraagd je deze gebeurtenis voor te stellen en daarna word je begeleid om je meer compassivolle zelf te laten ingrijpen in de situatie als je dat wilt.

^^Aangezien mensen soms moeite hebben om te begrijpen wat het precies betekent om zelf compassie te hebben, zullen we wat informatie over compassie geven  
</page>

<page Information2>

^Zelfcompassievol zijn houdt in.

^^Validatie: het doel van deze fase is te erkennen dat je overstuurt bent en dat je jezelf hier niet om veroordeelt en dat het volkomen acceptabel voor je is om op deze manier te reageren

^^Omleiding van aandacht: het doel van deze fase is om je aandacht te richten op iets dat positiever, rustiger en geruststellend is.

</Page>

<page Information3>

^^Nu nodigen we je uit om een herinnering te herinneren waar iemand anders liefdevol en aardig voor je was. Als alternatief kun je je ook een herinnering herinneren waarin je liefdevol en aardig voor een andere persoon was.

^^Deze herinneringen moeten gevoelens van warmte, comfort en veiligheid bevatten

</Page>

<page Information4>

^^Ten slotte willen we je aandacht vestigen op onderzoeksresultaten die aantonen dat personen die hoge prestaties leveren, vaak ook hoog scoren in zelfcompassie. Evenzo is een hoge mate van zelfcompassie gerelateerd aan minder eetgedragsproblemen en lichaamsontevredenheid.

</Page>

<text DistressLevel>

/ items = ("Kun je mij alsjeblieft aangeven wat je huidige niveau van stress is op een schaal van 0 tot 10? 10 betekent dat je bijna geen of helemaal geen stress ervaart, en 10 betekent dat je nu een extreem hoog niveau van stress hebt. Wat is je huidige stress niveau?")

/ fontstyle = ("8514oem", 1.33%, false, false, false, false, 5, 1)

/ txcolor = (0, 0, 0)

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Youtube link:

<https://youtu.be/XwKOcu0Gl6M>

## Appendix E

### *Script ImRs Intervention inducing self-mastery NL*

^ Hierna start je een beeldoefening waarbij je wordt gevraagd om de zojuist gerapporteerde herinnering opnieuw op te roepen. Eerst wordt je gevraagd je deze gebeurtenis voor te stellen en daarna word je begeleid om je meer zelfbekrachtigde zelf te laten ingrijpen in de situatie als je dat wilt.

^^Aangezien mensen soms moeite hebben om te begrijpen wat het precies betekent om zelfbeheersing te hebben, zullen we wat informatie geven over zelfbeheersing.

</page>

<page Information2>

^Zelfbeheersing houdt in.

^(1) Gevoel van controle: het doel van deze fase is om het bewustzijn te vergroten dat je controle hebt over de resultaten in je leven.

^(2) Actie: het doel van deze fase is om je aandacht te richten op acties om de situatie te beïnvloeden en / of op meer adaptieve beoordelingen van bedreiging en onzekerheid.

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<page Information3>

^^Nu nodigen we je uit om een herinnering op te roepen waarin iemand anders je heeft geholpen om je meer empowered en in control te voelen. Als alternatief kun je ook een herinnering onthouden waarbij je een andere persoon meer empowered en in control heeft geholpen.

^^ Deze herinneringen moeten gevoelens van empowerment en van controle omvatten

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<page Information4>

^^Ten slotte willen we uw aandacht vestigen op onderzoeksresultaten die aantonen dat personen die hoge prestaties leveren, vaak ook hoog scoren in zelfcompassie.

^^Evenzo is een hoge mate van zelfcompassie gerelateerd aan minder eetgedragsproblemen en lichaamsontevredenheid.

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<text DistressLevel>

/ items = ("Kun je mij alsjeblieft aangeven wat je huidige niveau van stress is op een schaal van 0 tot 10? 0 betekent dat je bijna geen of helemaal geen stress ervaart, en 10 betekent dat je nu een extreem hoog niveau van stress hebt. Wat is je huidige stress niveau?")

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</text>

You tube link:

[https://youtu.be/saft-L\\_8HQQ](https://youtu.be/saft-L_8HQQ)

## Appendix F

### *Information Letter*

#### INFORMATION LETTER

for participation in scientific research: “Don’t let your habits eat you”

#### **1a. Introduction/Aim of the research**

You are invited to take part in scientific research. The goal of the study is to find out more about the causes for distorted eating behaviors such as frequent dieting, eating too much and a distorted body image. During this study we want to find out if working with negative autobiographical memory might have an effect on changing someone's eating behavior and self-beliefs. To study this, we will be using questionnaires and an intervention within a group of people who might have weight problems and/or a negative body image but are not diagnosed with an eating disorder.

#### **1b. The research**

First, you will be asked to fill in a screening questionnaire. If you suit our research criteria, you will be asked to fill in another questionnaire. You can do that online. To do that, we will contact you via email. After that, you will be taking part in an intervention. One week after the intervention we will again ask you to fill in some questionnaires. If you have any questions about the measures, do not hesitate to ask them, preferably before or during your participation in the research. The study has been independently reviewed by the Ethics Committee Social Sciences (ECSS) of the Radboud University and there is no formal objection to this study.

#### **2a. Use of your personal data**

To conduct the research, it is necessary that your personal data are collected, used and stored. It concerns the following data: weight, height, age, name and e-mailadres. The use and storage of your personal data such as your weight, length and age are necessary to calculate your BMI. Your name and contact data will be used to invite you to take part in the second and third part of the study and to inform you in a case of clinical relevant findings.

#### **2b. Confidentiality of your data and data processing**

The information you provide for the current research purposes is treated with the utmost care and is accessible to authorized staff only. Personal data collected by the researcher about you will remain confidential throughout the research. In order to safeguard your privacy, the researcher saves your personal data using a process of encryption/pseudonymisation. This means that your name and any other particulars that can identify you directly, are kept

separate from the research data. It is only possible to find out which research data belongs to which person by means of a code or subject number. The link between data that can identify you directly and all other research data is stored in a key file. This key file is *encrypted and/or password protected*. Only authorized members of the research team have access to this information. No other parties involved in the research shall receive any data that can be traced

back to you. In order to disguise your identity, only anonymized research data are to be used in reports and publications regarding the research.

### **2c. Retention period of your data**

The consent form signed by you will be kept for 10 years upon completion of the research. Your (anonymized) research data will be stored *for 10 years* after the research has been completed. The link between your personal data and your research data will be kept for a maximum of 1 month following completion of the research. This means that you can request to have your research data deleted (by sending an email to f. kadriu@psych.ru.nl) no later than 1 month after the completion of the research. After that, your research data can no longer be deleted, as they are stored anonymously only. This means we no longer know which research data belongs to you personally.

### **2d. Sharing your data**

Due to the importance of control, reuse and/or replication of research results, research data (including any anonymous personal data) are increasingly shared with or made available to other researchers. Your data will be anonymized prior to this form of sharing. This means that you can no longer be identified on the basis of these data. If you do not want your anonymized data to be shared, you can request to have your data deleted up to a maximum of 1 month after completion of the research.

### **2e. Right of access by supervisory authorities to inspect the research's compliance with ruling guidelines**

Some persons and organizations must have access to your personal and research data. This is necessary in order to test whether the research has been carried out properly and reliably. These persons and supervisory authorities inspecting your data for verification include: authorized persons within *the Behavioral Science Institute* or Radboud University (for example a dean, director or data officer) and (inter) national supervisory authorities (for example the Dutch Data Protection Authority and the Netherlands Board on Research Integrity). They are held to inspecting your data on a strictly confidential basis. You will be asked to grant permission for this access. If you refuse to do so, you cannot participate in the study.

### **2f. Additional information on your rights regarding the processing of your personal data**

Radboud University is responsible for compliance with the General Data Protection Regulation (GDPR) when processing your personal data. The researcher ensures that your privacy and the conditions attached to it are safeguarded and he/she adheres to the Dutch code of conduct for scientific integrity and university policy regarding the storage and management of personal and research data when conducting this research. You have the right to withdraw your consent for the processing of your personal data at any time. Your personal data will then be deleted. You can find the Radboud University Privacy Statement at: <https://www.ru.nl/english/vaste-onderdelen/privacy-statement-radboud-university/>. If you have any questions about your privacy, please contact the Privacy Officer Faculty of Social Sciences (P.Janssen@socsci.ru.nl). For general questions, please contact the office of the Data Protection Officer of Radboud University via [privacy@ru.nl](mailto:privacy@ru.nl). More information about your

rights in the processing of your personal data can be found at <https://www.ru.nl/privacy/english/protection-personal-data/data-subjects-rights/> and on the website of the Dutch Data Protection Authority (<https://autoriteitpersoonsgegevens.nl/en>).

### **3. Findings that may be of personal clinical interest**

The obtained research data will not be viewed from a medical and/or clinical perspective. Therefore, your participation in the study cannot be considered a medical/clinical test. In exceptional cases, new data can be obtained regarding your health such as scores that are viewed as worrying and/or that may be of personal clinical importance. In such cases, you will be informed accordingly by the researcher (*Fortesa Kadriu*), up to a *maximum of 1 month* after participation in the study. If you do not wish to be informed on these findings, you cannot participate in the study.

### **4. Voluntary participation**

Your participation in this study is entirely voluntary. If you decide not to participate, there will be no consequences. If, during the course of the research, you wish to withdraw your consent and terminate your participation, you have every right to do so at all times. Again, there will be no adverse consequences for you.

### **5. Compensation or remuneration**

To thank you for your participation you will be granted 1 participation point (for RU Psychology students). At the end of the research, you will be granted the compensation.

### **6. Contact information**

In case of questions, comments or worries do not hesitate to contact the responsible researcher of this study.

Fortesa Kadriu,

F.Kadriu@psych.ru.nl

Telephone number: +31 6 57 632 465

Radboud University, Behavioural Science Institute, Department of Clinical Psychology

## Appendix G

### *Informed Consent Form*

#### CONSENT FORM

for participation in scientific research: Changing your eating habits?!

Hereby, I confirm that:

- I have been satisfactorily informed of the study in writing;
- I have read the written information [*version code:...*];
- I have been given the opportunity to ask questions about the study;
- my questions have been answered satisfactorily;
- I have been given ample opportunity to think about participating in the study;
- I participate in the study entirely on a voluntary basis.

I understand that:

- I have the right to withdraw my consent at any time without having to state reasons and without fear of adverse consequences by contacting Fortesa Kadriu via [f.kadriu@psych.ru.nl](mailto:f.kadriu@psych.ru.nl)
- I have the right to have my research data deleted up until 1 month after the research has been completed
- I have the right to withdraw my consent for the (further) processing of my (specific) personal data; my personal data are processed in accordance with the applicable European privacy regulations;
- my personal data are processed in accordance with the privacy statement of Radboud University (<https://www.ru.nl/english/vaste-onderdelen/privacy-statement-radboud-university/>);
- the tests and questionnaires used are not medical/clinical tests, but the researchers nonetheless have an obligation to inform me about scores that may be of personal clinical interest.

I agree that:

- my personal and/or research data within this research will be obtained for scientific purposes and will be available for verification, reuse and replication for 10 years;
- the signed consent form with my personal data is kept for 10 years;
- my personal data, which are obtained for administrative purposes only, will be kept for a maximum of [*1 month*] after completion of the research. Administrative goals include: [*to invite you for further measurements during the course of this study*]
- supervisory authorities may inspect my personal and research data for the purpose of auditing the research.

In addition, I also give permission:

- for processing the following (special) personal data about me\*: weight, height, age, name and e-mail address

YES	NO
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- that the researches contact me in case of clinical important scores\*

YES	NO
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**I understand that in order to participate in the study, I must answer 'YES' to all of the above points using an \*asterisk\*.**

**I agree to participate in the study.**

Name:

Signature:

Date:

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**To be completed by the researcher:**

I, the undersigned, herewith declare that the above-mentioned person has been informed both in writing and orally about the above-mentioned research.

Name:

Position/research institute:

Signature:

Date: