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*Exposure intervention of body-related memories – Will a repeated exposure intervention focusing on negative body- and appearance-related memories be helpful in improving a negative body image?*

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### **Abstract**

These days, especially women happen to suffer from having a negative body image and are subsequently affected by its consequences. Those can be impaired quality of life, impaired mental health outcomes, and in particular, heightened levels of undesirable emotions as body related self-disgust and shame. Such emotion schemas might specifically arise when triggered by memories or experiences associated with self-directed disgust and shame. As a consequence, maladaptive avoidance responses are developed and fostered through reinforcement. As past research has shown, exposure to these memories might possibly lead to a reduction of self-disgust, shame, and body image disturbances. Correspondingly, such habituation might lead to reduced behavioral avoidance patterns and to an increase of accepting one's body. The present study proposed that a repeated exposure intervention focusing on negative body- and appearance-related autobiographical memories might be helpful in improving a negative body image. Participants' self-report measures of self-disgust, avoidance, and shame were expected to decrease, while measures of acceptance should increase. 21 women were gathered for a counterbalanced pre-post measure within group design, and repeatedly exposed to disgust-eliciting and neutral memories. Feelings of self-disgust, avoidance, acceptance and shame were measured utilizing visual analogue scales (VAS) prior to and after exposure. Contrary to the hypotheses, paired sample t-tests demonstrated insignificant results. However, conclusions have to be made with caution due to a small sample size and questions about potential effects remain. Thus, further research should investigate such intervention within a larger, clinical sample.

*Keywords:* negative body image, self-disgust, avoidance, acceptance, shame, exposure, autobiographical memories

**Exposure intervention of body-related memories – Will a repeated exposure intervention focusing on negative body- and appearance-related memories be helpful in improving a negative body image?**

Over the past couple of years, previous research has shown that especially women in modern western societies happen to deal with negative body images and their consequences (Cash, 2002). A negative body image manifests itself predominantly in over-evaluation, preoccupation, dissatisfaction, and shame towards an individual's own body and appearance. A body image is only one of several components an individual's self-schema is based on. However, a negative body image can lead to an impairment in psychological as well as physical well-being (Tiggemann, 2004), since it is understood to consist of affective, cognitive, perceptual, and behavioral factors. These factors have an influence on a person's thoughts and feelings that are related to their appearance, how their body's shape, weight and height is appraised, and how they will act towards their body (Thompson & van den Berg, 2002). Moreover, due to the persistence and prevalence of a negative body image (which is based on a subjective evaluation) the impact it has on mental health outcomes, the occurrence of body-directed self-disgust, and the development and maintenance of eating disorders seems to be strong (Powell et al., 2015). These associated health concerns are seen to be a fundamental aspect of public health matters. Thus, it is important to find constructive interventions directed at improving body-dissatisfaction rates and negative body images and to further investigate contributing constructs (e.g., such as disgust) that are substantial in decreasing a negative body image (Mond et al., 2013), since rates of prevalence with respect to body-dissatisfaction in women have been growing (Cash & Henry, 1995).

Before introducing interventions to tackle body dissatisfaction, factors that contribute to developing such a negative body image are discussed. There are various reasons that help a negative body image develop, ranging from external to internal aspects. On one hand, societal

pressures such as the media, which promotes a certain ideal of what people should aim to look like and strive for, has an influence on stigmatizations and the conceptions people are integrating about themselves and their appearance (Oaten et al., 2011). A previous study found that body image issues in women are associated with the thin ideal (a concept of the female body, which is ideally slim), being depicted by the media (Grabe et al., 2008). Although this thin ideal body concept seems to be accepted widely among women, it is neither easily maintained nor even attained by most females (Wiseman et al., 1992). As a consequence, a gap emerges between the actual appearance of the average females' physique and the expected or desired appearance. Based on that dissonance, the more an individual has internalized the need for living up to such an ideal, the greater will be the extent of negative psychological effects, due to an increased self-objectification and experienced body-dissatisfaction (Veldhuis et al., 2020).

On the other hand, individual experiences that have been possibly made in childhood (i.e., traumatic memories) also make individuals more prone to be at risk of developing a negative body image (Karr et al., 2012). Research has shown that especially when being maltreated in childhood (i.e., sexual abuse, emotional abuse), individuals would report self-directed feelings of disgust more frequently (Power & Dalglish, 1999, 2008; Siegal et al., 2011). Another study conducted among female patients with borderline personality disorder also found that childhood abuse seems to be related to a disturbance in body image (Dyer et al., 2013). As a consequence of such experiences, a highly critical and negative thinking pattern regarding one's own body might arise, and therefore, even repulsive patterns might follow and remain stable throughout adolescence and adulthood (Powell et al., 2015; Tiggemann, 2004). Altogether, it may be concluded that various components, such as psychological, social and biological facets, might lead to the emergence of a negative body image, as further research in the field of eating disorders has shown (Fox et al., 2012).

Furthermore, research findings have shown support for the association between a negative body image in women and several negative emotions, such as experiencing feelings of disgust and shame towards their own body (Pinto-Gouveia & Matos, 2011; Powell et al., 2013). When those destructive emotions interact with a fundamental negative body image, the perception of the individual's self-concept can be affected and those emotions might be established within a person's autobiographical memory, which enables one to experience his or her own personhood and form an identity (Conway & Pleydell-Pearce, 2000).

As aforementioned, feelings of disgust and shame seem to be related to a negative body image. Previous research has found that especially in eating disorders, perceived self-disgust might be linked to psychopathology (Olantunji & McKay, 2007; Palmeira et al., 2019). The emotion schema of self-disgust is seen to be very persistent and maladaptive, and it internalizes an originally adaptive disgust response towards the self (Powell et al., 2015). What makes the self-evaluative emotion so strong, is the orientation towards the own being, as it is seen as a significant factor relating to the self-concept of an individual's own body, behavior and character (Powell et al., 2015). Therefore, it is perceived with high value and seen in a consistent manner. Subsequently a change within the self is difficult, while the maladaptive disgust response will be habituated and reinforced through repetition (Powell et al., 2013). The disgust reactions are seen as enduring, as they are triggered by certain aspects of the self, that are perceived to be constant and highly significant for the identification of oneself and are therefore hardly changeable (Powell, et al., 2015). Due to the triggered disgust-response towards own body parts, it is assumed that engaging in behavioral avoidance patterns results from it. From a biological and evolutionary perspective, disgust is displayed by a response towards stimuli that are perceived as repulsive (e.g., pathogens) and will be expressed facially in a distinctive way (i.e., wrinkled nose). It is characterized by a subjective experience (such as nausea) and avoidant behavior and cognition (von Spreckelsen et al.,

2018). Evolutionary seen, the reaction of disgust was aimed at avoiding infections and contaminations (Oaten et al., 2009). Though, when now individuals concerned with self-disgust initialize that avoidance response directed at themselves, these integrated behaviors might become maladaptive (Powell et al., 2013). Consequently, new learning experiences allowing for corrective information to be integrated are inhibited and negative body images will get reinforced and negative emotions associated (von Spreckelsen et al., 2018).

In particular, a previous study has found that people, that are seen to be high in disgust propensity (i.e., meaning that they will react more readily with disgust towards a given stimuli) will experience self-disgust even more and are also more likely to develop a negative body image. The reoccurrence of such experience over a certain period of time, will cause the negative construct to become stable and established (von Spreckelsen et al., 2018). Based on the emotion schema of self-disgust, an avoidance mechanism might arise and exposure toward disgust-eliciting stimuli (in such cases the own body) will be avoided. This could lead to avoidance of looking at their own body or even thinking about it. Such behavior may express itself in situations that are body-related (e.g., avoiding mirrors), and experiences that are made mentally (e.g., thought patterns). Subsequently, it prevents the appreciation of one's own attractive and positive body parts, and the habituation to and the re-evaluation of the subjectively perceived negative parts, which is why there is no access to corrective information, leaving them unintegrated (Olatunji et al., 2007). Such stable negative appraisal, which is expressed through disgust, will foster the development, reinforcement and maintenance of a negative body image. Moreover, another aspect, namely disgust sensitivity (i.e., the extent to which one finds the emotion of disgust to be unpleasant), also seems to lead to a heightened risk for possessing a negative body image, mediating the relation between disgust propensity and self-disgust, indicating that a high proneness in disgust could lead to a

higher risk in people for the development of a negative body image through a higher liability when self-directed disgust is developed (von Spreckelsen et al., 2018).

Next to the feelings of self-disgust, several other negative emotions seem to be associated with a negative body image. For instance, self-oriented constructs such as hatred and criticism are rather common to arise, and moreover, negative self-conscious emotions are established in form of shame, embarrassment, and guilt (Powell et al., 2014).

Particularly, feelings of shame also seem to play a role in negative body images (Duarte et al., 2015) and are related to eating disorders (Blythin et al., 2020). While self-disgust is based on avoiding risks of contamination, shame is understood to be a social emotion, focused on social status, stemming from a failure within the self, leading to a negative, undesirable appraisal by others (Powell et al., 2015; Gilbert, 2000). Some theorists even claim shame to be a fundamental instance of the feeling of disgust, objectifying the self (Power & Dalglish, 2008). Based on the biopsychosocial model of shame established by Gilbert, people intrinsically aim to adjust their behavior and characteristics to their social norms in order to match social groups (Gilbert, 2007). When individuals are unable to fit in these groups or deviate from their social norms, they are afraid to be judged negatively by others, which is why individuals might engage in characteristics and behaviors that seem to be desirable, so that a negative evaluation can be avoided (Gilbert, 2007). Applying this emotion to the context of negative body image, the feeling of body-related shame might arise through not living up to sociocultural bodily norms, that are understood to be acceptable in their environment. As more women experience pressure to fit within unrealistic ideals nowadays, societal pressure has an influence on the discrepancy between ideals and the actual average body, which elicits shame (Ferreira et al., 2013; Pinto-Gouveia et al., 2014). Again, maladaptive behavioral avoidance patterns toward the own body might emerge, and negative body image can get reinforced. Nevertheless, a clear relation between the two concepts of



self-disgust and shame is yet to be investigated. Previous literature claims self-disgust and shame to be two distinct emotional constructs that function differently (Powell et al., 2015). Other researchers understand self-disgust to be a more intense form of shame (Simpson et al., 2010). However, it can be said that the constructs of shame and self-disgust both aim to avoid the elicitation of aversive stimuli, and by internalizing behavioral and cognitive avoidance patterns (which are sensitive to the own body), a negative body image might be established.

More often than not, the definition of a body image takes on a great part in a woman's life and subsequently, a negative body image can have a negative impact on an individual's self-concept as well as self-esteem (Kling et al., 2018; Kékes Szabo, 2015). A person's autobiographical memory is seen to be an important source with regard to defining one's own identity and self-concept, and further relates to the persistence of negative emotions (Conway & Pleydell-Pearce, 2000). Memories, that contain aversive emotions, are hence able to build up a fundament for a person's identity, affecting their life story from daily inferences to expectations about the future (Pinto-Gouveia & Matos, 2011). In light of this, after thinking of experiences in which shame and body-related self-disgust are present, it is assumed that negative, aversive emotions come up more easily as a response to them and a behavioral avoidance pattern might be elicited. It is theorized, that these avoidance responses, elicited by disgust-eliciting memories, might inhibit the adaptive coping with negative, aversive emotions, which makes them become more intense and might foster a negative body image.

With regard to interventions, previous research has shown that exposure interventions, such as mirror exposure, play a successful role with regard to treatments aiming to reduce negative emotions and improving a negative body image (Griffen et al., 2018). Also, to target avoidance behaviors, exposure therapy has been found to be successful (Hofman & Hay, 2018). Within the course of exposure treatments, patients are facing feared stimuli that they are used to avoid, based on their integrated maladaptive response patterns. By doing so, it is

aimed to decrease negative effects, such as panic attacks or increased arousal and anxiety, that are caused by the stimuli (e.g., feared animals, memories etc.) (Myers & Davis, 2007). In the past, exposure interventions have become effective and successful treatment approaches in several areas, such as in conquering PTSD, depression, eating disorders, among others (Schnyder & Cloitre, 2015; Trentowska et al., 2014; Butler & Heimberg, 2020). Furthermore, exposure therapy's benefits in reducing negative symptoms of body dissatisfaction and, improving negative body images, and enhancing emotions that are positive, have been emphasized (Griffen et al., 2018). However, research in exposure interventions directed at self-disgust is still in its early phase and a study found that conditioned disgust would respond not as fast as conditioned fear and anxiety towards exposure (McKay, 2006; Smits et al., 2002). Subsequently, when aiming to target the negative emotion of self-disgust, it might be worth considering to undertake an exposure intervention several times in order to counteract its persistence and slower response. Additionally, considering the deep roots of autobiographical memories, it might be useful to target them in particular with exposure in order to specifically address the persistence of self-directed disgust. In another study, the positive impact interventions can have on reduction of disgust when being exposed to disgust-eliciting memories has been investigated (Badour & Feldner, 2016). In conclusion, it can be seen that established exposure interventions for several disorders exist. However, these focus mainly on eating disorders, anxiety disorders, or PTSD, for instance. Thus, a need for better and novel interventions is yet to be fulfilled. A focus on exposure interventions, in which they are combined with autobiographical memories to target self-disgust, would give new insight and inspiration within that area of research.

Based on that, we aim to investigate whether exposure to disgust-eliciting autobiographical memories can decrease the impulse of avoiding these memories, and the

level of disgust following these memories, which should then lead to an increased acceptance of the own body, a more positive body image, and the decrease of shame.

With our study, we want to create an exposure intervention for women with negative body images, which focuses on disgust-eliciting memories, while targeting avoidance through repeated exposure. We aim to investigate the effect it has on self-disgust, avoidance patterns, body-acceptance, and shame. The procedure involves the generation of autobiographical memory scripts referring to disgust-eliciting situations with each participant. Afterwards, the participants are asked to repeatedly listen to recordings of their own scripts, which will be the exposure intervention. It is assumed, that while doing so, negative self-directed emotions will arise, having an impact on the body image and currently held self-concept. While this might cause adverse emotions within the procedure, we propose that it will lead to a habituation of the feelings of self-disgust and reduce adverse emotions in the long term. Following hypotheses will be tested: (H1.1) Self-disgust levels following a disgust memory will decrease more in the disgust exposure condition than in the neutral one. (H1.2) Avoidance levels following a disgust memory will decrease more in the disgust exposure condition than in the neutral one. (H1.3) Body acceptance levels following a disgust memory will increase more in the disgust exposure condition than in the neutral one. (H1.4) Feelings of shame following a disgust memory will decrease more in the disgust exposure condition than in the neutral one.

## **Methods**

### **Study Design**

Within our study, we implemented a within-group pre-post experimental design. Regarding the sample size, a power analysis was done to be able to estimate a sufficient sample size prior to our study (G\*Power – version 3.0; Faul et al., 2007). With reference to a two-tailed independent samples t-test with a small effect size (ES) ( $d = .5$ ), 80% power, and  $\alpha = .01$  (since the participants were tested several times), a sample size consisting of 70

participants seemed to be adequate. Hence, our present study aimed to include at least 70 participants. Additionally, in order to review the power of our sample, a post-hoc power analysis using G\*Power was conducted (version 3.0; Faul et al., 2007). It reported a power of .07, with  $\alpha = .01$ . As a consequence of restrictions due to COVID-19, laboratories had to close and our testing could not be continued as we had planned, thus, the anticipated sample size could not be reached. To examine the final sample size ( $N = 21$ ), a second post-hoc analysis followed and reported a power of .8, with  $\alpha = .01$ , a sample size of 21, and a large ES ( $d = .8$ ). Nevertheless, as research about post-hoc power analyses has shown, misleading results can exist and thus results need to be interpreted with caution (Zhang et al., 2019). The study consisted of two sessions (T1, T2) for each participant, having a break of one week in between them. At T1, a random allocation would determine whether participants would either complete the control (neutral) or experimental (disgust) condition first, so that in T2 the condition would be counterbalanced. Within sequence A, our participants were allocated to the control (neutral) condition in T1 and to the experimental (disgust) condition in T2. Thus, in sequence B, participants would be presented with the experimental (disgust) condition first, followed by the control (neutral) condition in T2. The set-up of the second session was almost identical to the first one.

### **Participants**

In order to recruit our participants, we made use of two platforms from the University of Groningen, namely the 'Paid Participant Pool' and the SONA program. When gathered via the Paid Participant Pool, participants were rewarded through a financial compensation of 28 Euros. Within the SONA Program, participants consisted of first year Psychology students, who were rewarded through course credits. A pre-screening was conducted to assess whether participants were eligible for our study or not. An online questionnaire had to be filled out to be able to participate. Participants were included when they were female, had a mean score of

$\leq 2$  or  $\geq 4$  regarding two items in the Self-Disgust in Eating Disorders Scale (SDES), indicated that they were able to understand, write, and speak English professionally, gave a negative answer to the simulation questions, had no post-traumatic symptoms from a sexual trauma, and gave their consent for contacting them in order to participate in the lab-study. Eventually, the total sample size was composed of  $N = 21$  females. All of them were psychology students from the University of Groningen, with a mean age of 19.6 years and a range from 18 to 24 years ( $SD = 2.13$ ). With regard to their nationality, 17.4% of the participants were Dutch, 13.0% were German, and 2.2% were from other countries (e.g., France). Yet, the descriptions examined are solely represented by approximately one third of the total sample, as several data points regarding age, nationality, and degree of study from the females that remained were missing and thus, 67.4% were unknown. 28.6% of the participants consisted of psychology students, while 71.4% did not indicate their degree. As the level of proficiency in English was assessed as criteria for admission, it was made sure that all participants showed such. Furthermore, participants were only included in the analysis when both sessions, i.e., T1 as well as T2, were completed by the individual (based on that two participants had to be excluded). With respect to body data, the participants' weight ranged from 52.0 to 108.0kg ( $M = 67.3$ ,  $SD = 12.3$ ), and their height from 1.51 to 1.84m ( $M = 1.68$ ,  $SD = 0.10$ ). Additionally, the BMI was evaluated with a mean score of 23.52, ranging from 17.9 to 32.3 ( $SD = 3.14$ ).

## Measures

**Self-Disgust, Avoidance, Acceptance, and Shame.** In order to see to which extent participants were expressing feelings of self-disgust, avoidance, body acceptance, and shame, we made use of visual analogue scales (VAS) just before and after they were exposed to autobiographical memories. By asking the question 'To what extent do you feel disgusted by your body right now?', the level of self-disgust was estimated. With the questions 'To what extent did you try to stop thinking about the most distressing part of the memory?' and 'To

what extent did you try to distract yourself from the most distressing part of the memory?’ the level of avoidance was indicated. ‘To what extent are you accepting your body right now?’ gave information about the level of body acceptance and ‘To what extent do you feel ashamed of your body right now?’ investigated the level of shame. Participants had to respond by indicating their answer on a continuous scale (ranging from ‘not at all’ (0) to ‘very much’ (100), where greater severity of the variable was displayed by higher scores). In clinical research, a VAS is a commonly used assessment tool with regard to obtaining information about the severity of symptoms, as single factors can be measured on a continuum (Paul-Dauphin et al., 1999) and a high temporal validity (with  $r = .94$ ,  $p < .001$ ) was reported by Ferraz et al. (1990). For the BDAQ, Cronbach’s alpha displayed an internal consistency of  $\alpha = .942$ , and an internal consistency of  $\alpha = .950$  for the DAQ.

**Self-Disgust.** Another self-report questionnaire was used in order to measure the level of self-disgust, the Self-Disgust Eating Disorder Scale (SDES), consisting of 16 items assessed with a 7-point Likert scale, ranging from ‘strongly agree’ to ‘strongly disagree’. Due to 6 filler items, there are 10 items remaining for scoring (Allen et al., 2014). The degree to which participants identified with statements that expressed self-disgust was evaluated (e.g., ‘It sickens me to look at myself’ or ‘I find myself repulsive’). The higher the score, the higher the level of self-disgust was reflected. Those measurements were done during the screening. Cronbach’s alpha displayed an internal consistency of  $\alpha = .54$ .

**Additional Questionnaires.** Aforementioned measures are within the main focus of this study. However, since it also belongs to a larger project, additional used materials will be described below.

**Demographic assessment.** To assess the participants’ age, gender, level of education, nationality, and their English proficiency level, several questions were included to check each category.

***Sexual Trauma Assessment.*** While the screening was undertaken, post-traumatic symptoms regarding sexual abuse were assessed with the question ‘Has anyone ever made or pressured you into having some type of unwanted sexual contact?’, to see whether participants were suffering from them. When ‘yes’ was indicated, the Trauma Screening Questionnaire (TSQ) followed (Brewin et al., 2002). It consisted of ten questions that aimed to estimate experienced symptoms related to post-traumatic stress disorders within the past week. Those who answered six or more questions positively on the TSC were excluded and not allowed to take part in the study, as we figured that a confrontation including repulsive autobiographical memories could have too much of a distressing impact on them.

***Simulation.*** Based on the Structured Inventory of Malingered Symptomatology (SIMS; Smith & Burger, 1997), it was aimed to detect potential simulators by using two questions such as ‘I have trouble remembering my date of birth’ and ‘I never laugh’. When one participant would agree to one of them or both, they were excluded from the lab-study.

***Eating Disorder Examination Questionnaire (EDE-Q).*** With the EDE-Q created by Fairburn and Beglin (2008), eating disorder behavior and pathology could be assessed based on 34 items of a self-report questionnaire, that are evaluated with a 7-point Likert scale. These indicate the extent to which participants displayed symptoms related to eating disorders within the past 28 days (‘no days’ (0) to ‘every day (6)'). The higher the score, the more severe were the symptoms. Within the project, it was focused on two of the four subscales (‘restraint’, ‘eating concern’, ‘weight concern’, and ‘shape concerns’), namely weight and shape, as representing variables of a negative body image. Their calculation was done by averaging items scores. An acceptable internal consistency was demonstrated by Conbrach’s alpha with  $\alpha = .73$ , as the two subscales were combined.

***Disgust Avoidance Questionnaire (DAQ).*** Concerning the assessment of the participant’s tendency to avoid the experience of disgust, the Disgust Avoidance

Questionnaire (DAQ; von Spreckelsen et al., 2020) was used. It contains 17 items and four subscales ('disgust prevention', 'disgust escape', 'cognitive disgust avoidance', 'behavioural disgust avoidance'). With respect to assessing the tendency of avoiding body-related disgust, a body-related version of the DAQ, namely the Body-related Disgust Avoidance Questionnaire (B-DAQ), was used (von Spreckelsen et al., 2020). It contains 18 items and four subscales ('disgust prevention', 'disgust escape', 'cognitive disgust avoidance', 'behavioural disgust avoidance'). Within the DAQ and the B-DAQ, answers of the items are assessed on a 7-point Likert scale ('strongly disagree' (0) – 'strongly agree' (7)), while for the subscales, items are summed up per subscale.

### **Procedure**

**Lab-study.** We invited our qualified participants to the lab at two points in time, to conduct the first session (T1) and after one week had passed, they were asked to come for the second session (T2). As the participants came to the laboratory for the first time, they were welcomed and we provided them with an information form they could read through and the informed consent, which they were asked to sign. To each participant, one researcher of our group was present. As soon as the informed consent form was signed, we allocated a participant number to them and introduced how our study was set up and what they were to expect during the session. In case no further questions remained from the participant's side, we clarified once again that everything would be handled confidentially and that their partaking was completely voluntarily, thus they should feel free to stop at any given moment, since the procedure involved giving detailed description of negative body related experiences. When the participants agreed to start, we gave further instructions about how the memory scripts were going to be generated (Figure 1 will give a table overview of the design of the study).



**Script generation.** The procedure started by asking the participants to generate four memory scripts in total, two for the control (neutral) condition and two for the experimental (disgust) condition. Participants needed to think of experiences or situations in which they either felt ‘neutral’ or ‘disgusted by themselves’, and explain those thoroughly, while the researcher would listen to it and write it down in a document. The experience had to be told in present tense and in the first person-perspective, so that the memory could be relived as vividly as possible. To ensure that every important information was gathered, we could check on a list for guiding questions as well as inspirations for the participant, in case someone would not be able to think of something. We tried to generate scripts which were about 300 words long and afterwards we edited them to correct for grammar and spelling errors. Having done so, we showed the script to the participants and when they felt like it represented their memory correctly, they were asked to read them out loud one by one while being recorded. Approximately, the recordings were about two minutes long.

**Neutral Memories.** First, we asked the participants to tell us about a past ‘neutral’ memory, to create the ‘neutral’ script. To do so, they would have to think back of an experience which they considered to be emotionally neutral, without having a strong effect on their mood. Instead of emotions, participants were asked to rather put the focus on the situational setting, such as their environment and their location and the associated behaviors, thoughts, and sensations (e.g., grocery shopping).

**Disgust Memories.** Afterwards, we proceeded with the ‘disgust’ memory generation, in which participants were asked to think back of an experience in which they remember feeling disgusted towards their own body. In contrast to the ‘neutral’ memory script, they needed to focus on their emotions and thoughts, as well as behavior and sensations in order to give a detailed description of their feelings and physical reactions, especially in relation to their perceived self-disgust. To make sure we elicited such feelings, we explicitly asked

questions that would give more insight (e.g., ‘How do you feel in your body?’, ‘Do you experience any bodily discomfort?’). Participants were aware that aversive emotions could come up and that they should try to resist the avoidance-impulse.

**Trait Questionnaires.** After having recorded four memory scripts, self-report trait questionnaires (EDE-Q, SDES) as well as questions regarding their demographics had to be filled out by the participants. Furthermore, information from the Body Checking and Avoidance Questionnaire (BCAQ; Shafran et al., 2004), and the Disgust Avoidance Questionnaire (DAQ; von Spreckelsen et al., 2020) was gathered, while the researcher was editing the audio files to set them into the experiment.

**Exposure Phase.** With a program called open sesame, we integrated the participant’s audio files and the VAS in order to evaluate the emotions felt before and after having listened to each of their memory scripts. When it was the first session, participants were now allocated randomly to one of the two conditions. However, in both conditions were the participants firstly exposed to a disgust-eliciting memory, serving as a form of pre-assessment to indicate their feelings of self-disgust, avoidance, acceptance of their body, and shame on the VAS. Afterwards, the listening to the recordings began. In the ‘neutral’ condition in T1, participants listened five times to their first neutral memory, and then again five times to their second neutral memory. The ‘disgust’ condition presented first five times the first ‘disgust’ memory to the participants, and then the second ‘disgust’ memory for five times. In the end, both groups had to listen to their first ‘disgust’ memory and indicated a rating of their associated feelings as a post-assessment on the VAS.

**Debriefing.** As the exposure intervention was finished, participants were shown a video of body positivity, which should function as a mood repair. Afterwards, we engaged in a conversation with the participant to see how they felt and to know how they evaluated taking part in the study. In case they felt like it could have a negative impact on their

wellbeing, they were informed that they could reach out for our supervisor, which no one did.

At the end of the session, we fully debriefed our participants about the purpose of the study

(A letter of the informed consent form can be found in Appendix B).

## Figure 1

### Overview of the Study Design

		<b>T1 (2h)</b>					
		Pre	Exposure Block 1		Exposure Block 2	Post	
<b>Exposure Timepoint</b>		0	1-5	6-7	8-12	13	
<b>Group A</b>	SG, T	VAS D1	VAS N1	VAS (2x)	N2 VAS	D1 VAS	Deb
<b>Group B</b>	SG, T	VAS D1	VAS D1	VAS (2x)	D2 VAS	D1 VAS	Deb
<b>Min</b>	60		15.30		15.30		

		<b>T2 (2h)</b>					
		Pre	Exposure Block 1		Exposure Block 2	Post	
<b>Exposure Timepoint</b>		0	1-5	6-7	8-12	13	
<b>Group A</b>	SG, T	VAS D3	VAS D3	VAS (2x)	D4 VAS	D3 VAS	Deb
<b>Group B</b>	SG, T	VAS D3	VAS N3	VAS (2x)	N4 VAS	D3VAS	Deb
<b>Min</b>	60		15.30		15.30		

*Note.* T1/T2 = Timepoint 1/2; SG = Script-generation; T = Trait measures; D (1-4) = Disgust memory (1-4); N (1-4) = Neutral memory (1-4); VAS = Visual Analogue Scales; Deb = Debriefing.

### Statistical Analysis

To inspect whether the assumption of normality was met by the difference scores, quantile-quantile-plots were administered (see Appendix A). However, even in cases of violations, t-tests are considered to be a powerful analysis approach (Edgell & Noon, 1984).

We used the 26<sup>th</sup> version of SPSS to analyze our collected data. In order to examine self-disgust, avoidance, acceptance, and shame, difference scores of pre- and post-exposure measurements of the VAS were used. To investigate all four hypotheses, within each condition (disgust and neutral), their difference scores were calculated by subtracting post-measures from pre-measures (self-disgust pre – self-disgust post, avoidance pre – avoidance – post, body-dissatisfaction pre – body dissatisfaction post, shame pre – shame post). To see whether the intervention led to a significant alteration of the scores, paired samples t-tests were used for comparing the difference scores of self-disgust, avoidance, acceptance and shame in the disgust condition to their difference scores in the neutral condition.

## Results

### Preliminary analysis

The descriptive statistics are displayed by Table 1 and 2. Before the main analysis was conducted, outliers were checked and found within the range of three SDs, indicating that the data could be evaluated without the presence of outliers. Utilizing quantile-quantile plots, it could be demonstrated that the assumption of normality seemed to be violated.

### Hypothesis 1

The first hypothesis claims that self-disgust levels that follow after the self-disgust exposure, will decrease more than in response to the neutral exposure. In order to compare the difference score of self-disgust from the disgust exposure condition to the difference score from the neutral exposure condition, a paired samples t-test was used. To be able to calculate this, a computation of new variables was necessary and done by subtracting post-measures from pre-measures. These variables could now display the difference scores between the pre- and post-measure of the VAS scores for the neutral as well as the exposure condition. This was done for all variables of the four hypotheses. The analysis revealed non-significant results of the difference between the scores of the exposure condition ( $M = 0.71$ ,  $SD = 12.35$ ), and

the neutral condition ( $M = 4.37, SD = 15.22$ ), with  $t(20) = .86$ , and  $p = .40$ , displaying no statistical difference between the neutral- and disgust-condition.

### **Hypothesis 2**

With reference to the second hypothesis, that stated that avoidance levels following the exposure condition would decrease more than in the neutral condition, a paired samples t-test on difference scores of the VAS representing avoidance levels was conducted. Again, insignificant results were displayed by the analysis. The results revealed a non-significant difference between the scores of the exposure condition ( $M = -7.90, SD = 19.27$ , Avoidance Q1;  $M = -5.11, SD = 18.16$ , Avoidance Q2) and the neutral condition ( $M = -.83, SD = 22.53$  Avoidance Q1;  $M = -6.16, SD = 27.73$ , Avoidance Q2), with  $t(20) = .96, p = .35$  (Avoidance Q1) and with  $t(20) = -.13, p = .90$  (Avoidance Q2).

### **Hypothesis 3**

With regard to the third hypothesis, it was assumed that body acceptance levels will increase more in response to the exposure condition than in response to the neutral one. The analysis showed a non-significant outcome of the difference between the scores of the exposure condition ( $M = 5.13, SD = 13.24$ ), and the neutral condition ( $M = 2.34, SD = 11.89$ ), with  $t(20) = -.72$ , and  $p = .48$ .

### **Hypothesis 4**

Concerning the fourth hypothesis analyzed the feelings of shame and argued that those would decrease more in the exposure condition than in the neutral condition. Again, non-significant results of the difference scores were found with regard to the exposure condition ( $M = 0.29, SD = 10.11$ ), and the neutral condition ( $M = -0.23, SD = 11.97$ ), with  $t(20) = -.16$ , and  $p = .88$ .

**Table 1**

*Descriptive Statistics of the Difference Scores of the Neutral and Exposure Condition of each variable.*

	<i>M (SD)</i>	
	Neutral ( <i>n</i> = 21)	Exposure ( <i>n</i> = 21)
Disgust	4.37 (15.22)	.71 (12.35)
Avoidance 1	-.83 (22.53)	-7.9 (19.27)
Avoidance 2	-6.16 (27.73)	-5.11 (18.16)
Acceptance	2.34 (11.89)	5.13 (13.24)
Shame	-.229 (11.97)	.29 (10.11)

*Note.* Measured by VAS scores (ranging from 0-100) in the exposure and neutral condition.

### **Discussion**

The aim of this study was to take a closer look at the aforementioned constructs, and whether they can be influenced by and even counteracted or enhanced with exposure. As a result, it was suggested that behavioral patterns of avoidance could be overcome by being able to receive corrective information about the self. In particular, the effect of repeated exposure to disgust-eliciting memories on individual levels of self-disgust, avoidance, shame and acceptance was examined. We proposed that different scores between the neutral exposure and the disgust exposure condition might be observed (i.e., decreased disgust, avoidance, and shame scores, and higher acceptance scores after the disgust exposure condition). For all four hypotheses, no significant results were displayed by analyzing the collected data. A post hoc analysis revealed that the main reasons for the insignificant findings might be associated with

the small sample size and lack of power. Hence, no definite conclusions can be drawn from the outcome and inferences have to be made with caution.

Negative body image concerns are an issue that is far-reaching especially in modern western societies among females (Cash, 2002). Individuals might suffer from mental health issues, that have major consequences and influences on their lives (Powell et al., 2015). It is displayed by experiencing emotions that are aversive and revolting, i.e., feelings of shame and self-disgust. Those aspects lead to body-dissatisfaction, a construct related to autobiographical memories (Conway & Pleydell-Pearce, 2000). As a reaction towards thoughts about the self-concept, negative, aversive emotions might arise and can lead to an elicitation of maladaptive behavioral patterns displayed by avoidance responses (Powell et al., 2013). When now a negative self-schema is manifested, aversive emotions arise when facing it. In the past, exposure therapy approaches have been shown to be successful in treating various mental disorders. Since body image concerns are widespread among women, it is a matter of importance to do research focusing on exploring potential effects of exposure therapy aimed at self-disgust and to investigate the role of autobiographical memories in maintaining a negative body image.

In line with previous research, the current hypotheses were based on the idea that a person's self-schema is, among other factors, based on autobiographical memories. Thus, when there is an individual suffering from a negative body image in combination with high potential to experience feelings of disgust, it is assumed to be related to high perception of self-disgust directed at their own body (von Spreckelsen et al., 2018). When now autobiographical memories about the own body are leading to disgust eliciting emotions, the individual might aim to prevent body related self-disgust by escaping from body related thoughts, perceptions, and memories. Due to that reaction, avoidance responses become reinforced and disgust levels may increase or at least have no chance to become less since

there is no opportunity of processing new, corrective information about the own appearance, and thus no new memories about own body will be integrated. With the exposure intervention it was aimed to break through the cycle of avoiding. Additionally, it was directed at feelings of disgust and shame so that the perception of the feeling of it would be habituated, leading to higher levels of acceptance of the own body. Moreover, the intervention was based on a repeated exposure approach since exposure to disgust eliciting stimuli, such as in phobias (Van den Hout et al., 2011), has been shown to be successful in the course of treatment, as well as mirror exposure in eating disorders (Griffen et al., 2018). Also, with regard to PTSD, exposure interventions helped in treating disgust-eliciting traumatic memories (Badour et al., 2016). Hence, following a successful repeated exposure intervention towards disgust eliciting memories directed at the own body and at counteracting avoidance, individuals should feel less of an urge to avoid their memories, less feelings of disgust responding to their memories. Thus less feelings of self-disgust, less feelings of shame, and subsequently more acceptance towards their own body should follow.

With regard to the first hypothesis, the exposure condition showed no effect on the levels of self-disgust. It was expected that self-disgust levels would decrease more after being confronted with the disgust exposure condition. From these results, no conclusion can be drawn about the effect such exposure intervention has on levels of self-disgust. Negative findings could be explained based on previous observations that showed that compared to conditioned fear and anxiety responses, conditioned disgust responses react more slowly towards exposure (McKay, 2006; Smits et al., 2002) and might need more time for habituation (Meunier & Tolin, 2009). Since the emotion of self-disgust is known for its resistance, particularly due to the elicited avoidance responses (Dalmeijer et al., 2021), the duration of the exposure condition could be considered to be extended in length or repetitions, in order to account for the slower response of disgust to exposure. Regarding previous



research, other exposure therapy sessions usually consist of a length up to 90 minutes (Schnyder & Cloitre, 2015), suggesting that our time span might have been too short, especially with the target of self-disgust. Referring to H1.2, no inferences can be made about the influence the disgust exposure intervention may have on levels of avoidance due to the insignificant results. It was assumed that following such exposure towards disgust eliciting autobiographical memories, avoidance levels would decrease. Negative findings might be related to unaffected levels of self-disgust. Research showed that avoidance responses seem to be behavioral patterns resulting from high levels of self-disgust (von Spreckelsen, 2018), since disgust is actually a motivational factor for avoiding exposure towards disgust eliciting cues (Rozin et al., 1999; van Overveld et al., 2010). Hence, avoidance responses should decrease particularly in association with lowered levels of self-disgust, which did not happen. Also, with regard to the third hypothesis no conclusion can be drawn from the findings. Insignificant results do not allow for any statement about the relation between the exposure intervention and body acceptance levels, which were expected to increase following the disgust exposure condition. Negative findings could be further explained by the observation that body image disturbances and self-disgust are associated, as suggested by preliminary evidence (Moncrieff-Boyd, et al., 2014). Moreover, avoidance induced by self-disgust may lead to a contribution to the persistence of negative body appraisals (von Spreckelsen et al., 2018). Especially when avoiding body-related experiences or situations, appreciating one's own attractive parts of the body, and habituating and re-evaluating the aversive parts might be prevented (von Spreckelsen et al., 2018). As a consequence, there is no access to corrective information regarding negative associations that could actually help to develop more positive associations (von Spreckelsen et al., 2018). Since the two concepts of self-disgust and avoidance did not show significant changes, no significant change within acceptance levels could result from that, as the persistent negative body image remained unaffected hindering

individuals from becoming less preoccupied and dissatisfied with their body image. Also, previous research has shown that when focusing on the increase of body satisfaction and acceptance, addressing body image issues with a positive approach can be successful. For instance, within a study conducted by Glashouwer et al. (2016) where participants had to engage in gazing patterns focusing on body parts which they liked about themselves and talk in a way that was self-enhancing, shape concerns and body ratings could be improved. Hence, drawing attention away from problematic aspects and altering attentional bias could be helpful in improving body satisfaction (Smeets et al., 2011). Additionally, a pilot study conducted by Linde et al. (2015) suggested that in order to treat body dysmorphic disorders, acceptance-based exposure therapies seem to be effective. Considering H1.4, insignificant results showed no effect of the exposure intervention on levels of shame, either. They were expected to decrease following the disgust exposure condition. Negative findings could further stem from the target the intervention had. Since shame and disgust can be considered to be distinctive constructs with serving different functions (Powell et al., 2015), targeting only self-disgust eliciting autobiographical memories could not be sufficient and perhaps the construct of shame itself needs to be targeted more specifically (Powell et al., 2015; Gilbert, 2000).

As mentioned above, the study faced methodological difficulties with regard to a small sample size and the lack of power, which might be one of the main reasons for the insignificant results. In research, small sample sizes are a risk factor for finding null results and lacking power (Müller et al., 2002). Due to laboratory restrictions in relation to COVID-19 regulations, the collection and testing of participants had to be stopped before the amount of initially aimed participants could be gathered. In order to write the Master Thesis, the analysis began with the existing sample at that time. Moreover, other limitations might be that the sample was solely represented by Caucasian females within a certain range of age,

studying psychology. Due to such homogenous sample, generalizations of females to the general population or women with clinically diagnosed body image disturbances should be made carefully. Although studies found that females seem to be more often dissatisfied with their body image than males (Davison & McCabe, 2005), negative body image concerns and associated eating disorders are also an issue for the male population. An article written by Weltzin et al. (2005) thematizing eating disorders among men, showed how they would engage less in seeking help when suffering from eating disorders resulting from negative body image. Due to cultural biases, more often than not eating disorders are rather perceived as female disorders, which should be taken into consideration for further research. As compensation for participating in the study, individuals were rewarded with either SONA credits or financial compensation. This might give reason to think about how an individual would approach taking part in the study and whether the participation was done reasonably, as they might have been externally motivated, possibly reducing intrinsic motivation (Pink, 2011). Beyond that, it could not be tested to which extent an individual would be able to engage in the exposure experience and relive the memory, since lost information can be influential (Bauer, 2015) and some contextual details might not have been recalled. With generating their memories, participants had to come up with an event rather spontaneously, which might have had an impact on its severity or intensity it was perceived. Perhaps, with more time to think about and generate an important event that has had an influence on them, the intensity of perceived self-disgust during the exposure could have been higher. Also, the researcher they had to open up to, was a person they had just met in that setting. As research in a PTSD study regarding exposure therapy suggests, therapeutic alliances play an important role for the effectiveness and course of therapy, since it affects the engagement in and outcome of the treatment (Theodore, 2018). Further investigations could potentially pay more attention to establishing a therapeutic relationship. Moreover, throughout the whole

experiment, English was the only language spoken. Since linguistic characteristics are considered to be stable properties of autobiographical memories (Schrauf & Rubin, 2000), the effect of a foreign language could have made an influence on the perceived intensity for non-natives. Future research should try to make the participant relive their memories based on their native language. Referring to the constructs measured, negative body image is a broad term cannot be measure and based solely on a few constructs and hence ultimately end up in changing body-dissatisfaction or acceptance. There are various conceptual foundations that make up one's body image as explored in an article by (Tylka & Wood-Barcalow, 2015). Thus, perhaps targeting more constructs could be beneficial and should be considered in future studies.

However, there are also considerable strengths to the study that need to be mentioned. This project was the first experimental study to directly examine the effect of repeated exposure to disgust-eliciting autobiographical memories, being conducted within a laboratory setting. Levels of self-disgust, avoidance, body-acceptance and shame before the exposure intervention could be compared to levels afterwards, as they were measured at two points in time. Moreover, self-disgust could be induced within the individuals, enabling the disgust-eliciting confrontation. With regard to the study design, it was possible to examine the causal association between exposure towards disgust-eliciting autobiographical memories and the levels of self-disgust, avoidance, body-acceptance, and shame. Additionally, with the counterbalanced within-group design, it was possible to once expose the participants to the disgust exposure condition as well as to the neutral exposure condition. Therefore, differences within measured variables that would possibly stem from differences in the sequence or participants could be ruled out.

**Table 2***Descriptive Statistics of the investigated variables of the Neutral and Exposure Condition*

		<i>M (SD)</i>	
		Neutral ( <i>n</i> = 21)	Disgust ( <i>n</i> = 21)
Disgust	Pre	62.11 (24.82)	61.41 (25.84)
	Post	57.74 (22.74)	60.7 (24.76)
Avoidance 1	Pre	47.28 (26.01)	46.43 (30.92)
	Post	48.1 (25.33)	54.32 (31.08)
Avoidance 2	Pre	43.94 (26.33)	49.9 (33.62)
	Post	50.1 (31.48)	55.01 (33.76)
Acceptance	Pre	35.72 (23.84)	32.87 (20.95)
	Post	38.07 (20.95)	38 (23.06)
Shame	Pre	60.92 (26.77)	60.4 (27.21)
	Post	61.15 (25.38)	60.11 (26.77)

*Note.* Pre- and post-measures of the investigated variables are displayed for each condition.

## Conclusion

The exposure intervention of the present study was one of the first to investigate which effect a repeated exposure towards disgust-eliciting autobiographical memories can have on concerns of negative body images, particularly with regard to self-disgust, avoidance, acceptance, and shame. With the implementation of the exposure intervention, it was suggested that such approach could lead to a decrease within self-disgust, avoidance, and shame and to an increase within acceptance levels. The analysis reported insignificant findings for all aforementioned hypotheses and no effects of the exposure treatment could be supported. This study was only able to gather a small sample size. Nevertheless, it shed light on the investigation of possible treatment approaches to reduce negative consequences of self-disgust. Therefore, potential effects of such intervention aimed at autobiographical memories

should be examined further, to see whether an improved body image could potentially result from it. Future research should aim to make use of larger sample sizes and experimental control.

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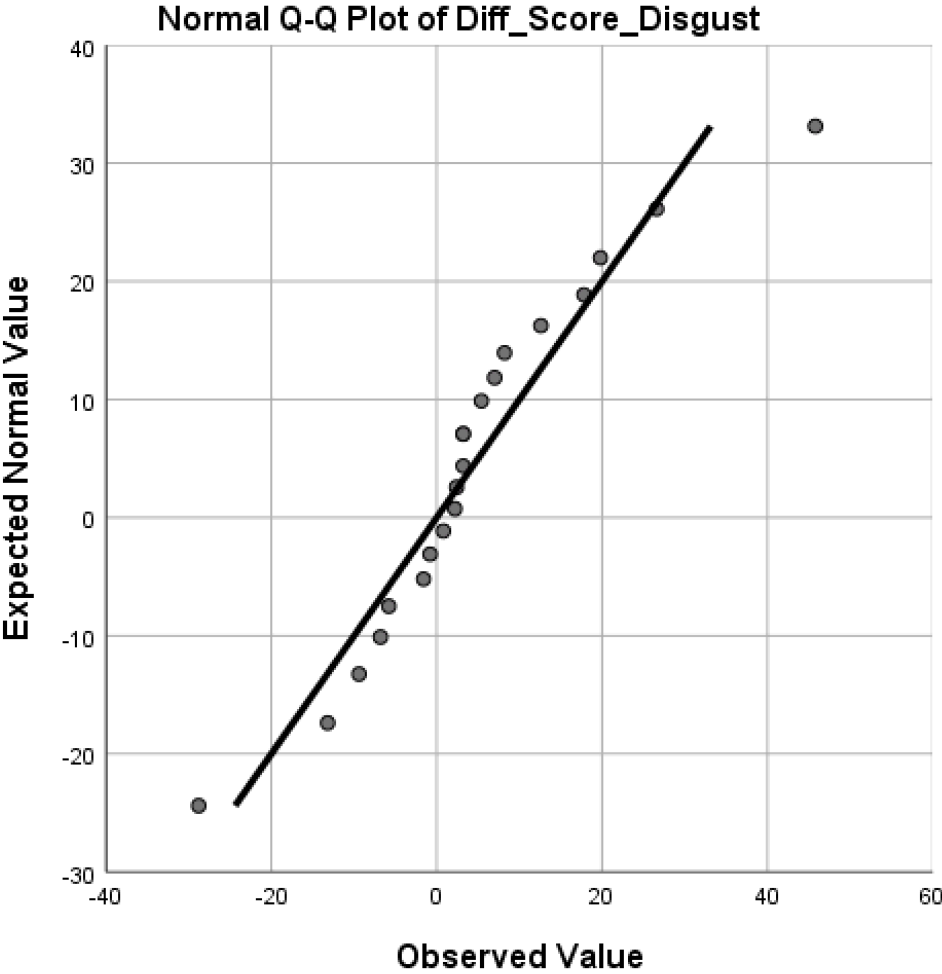
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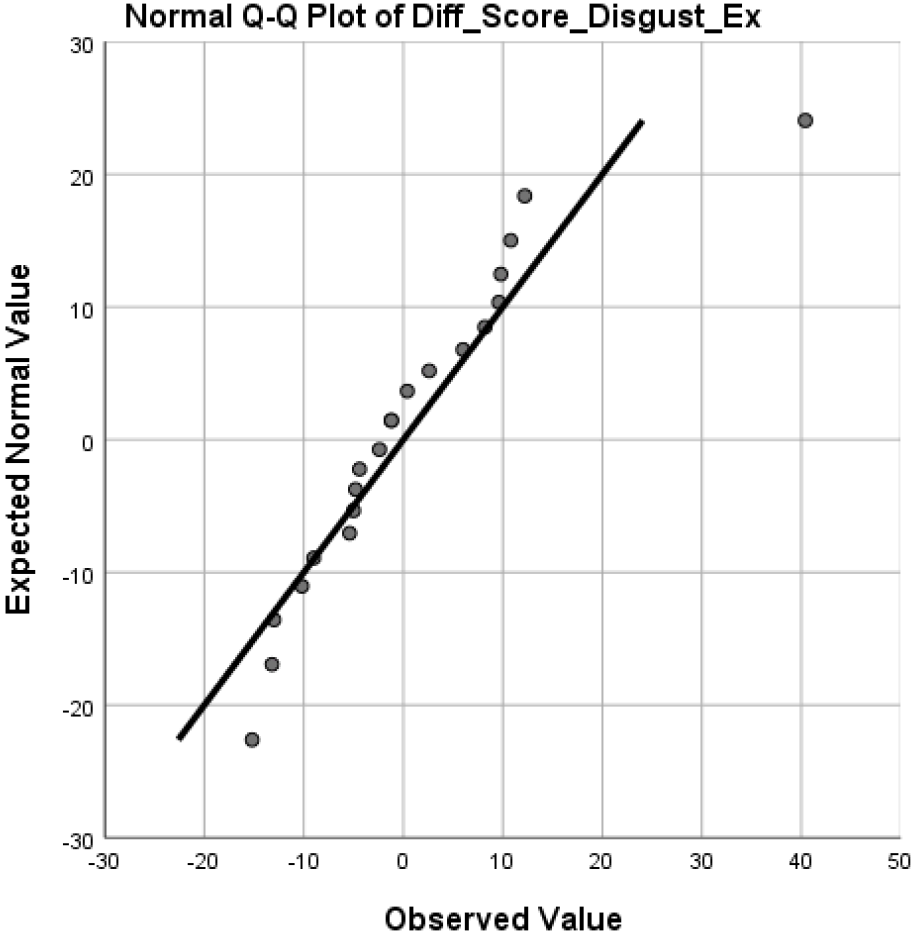
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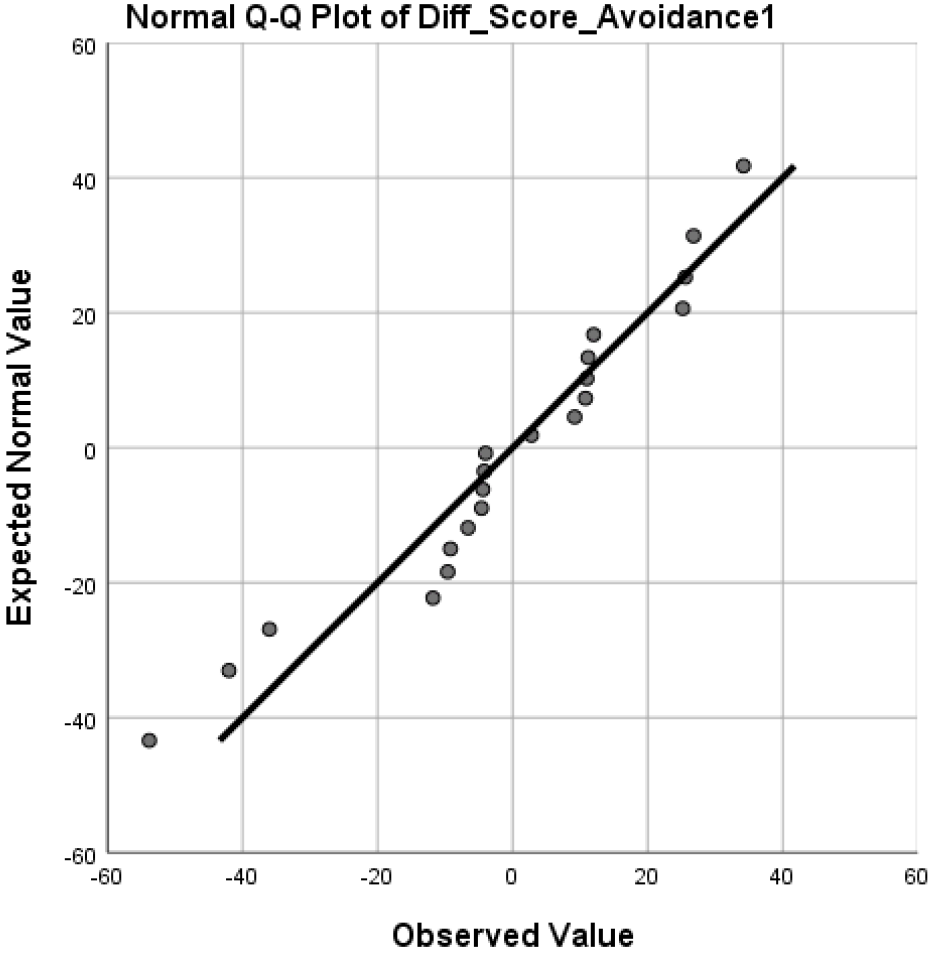


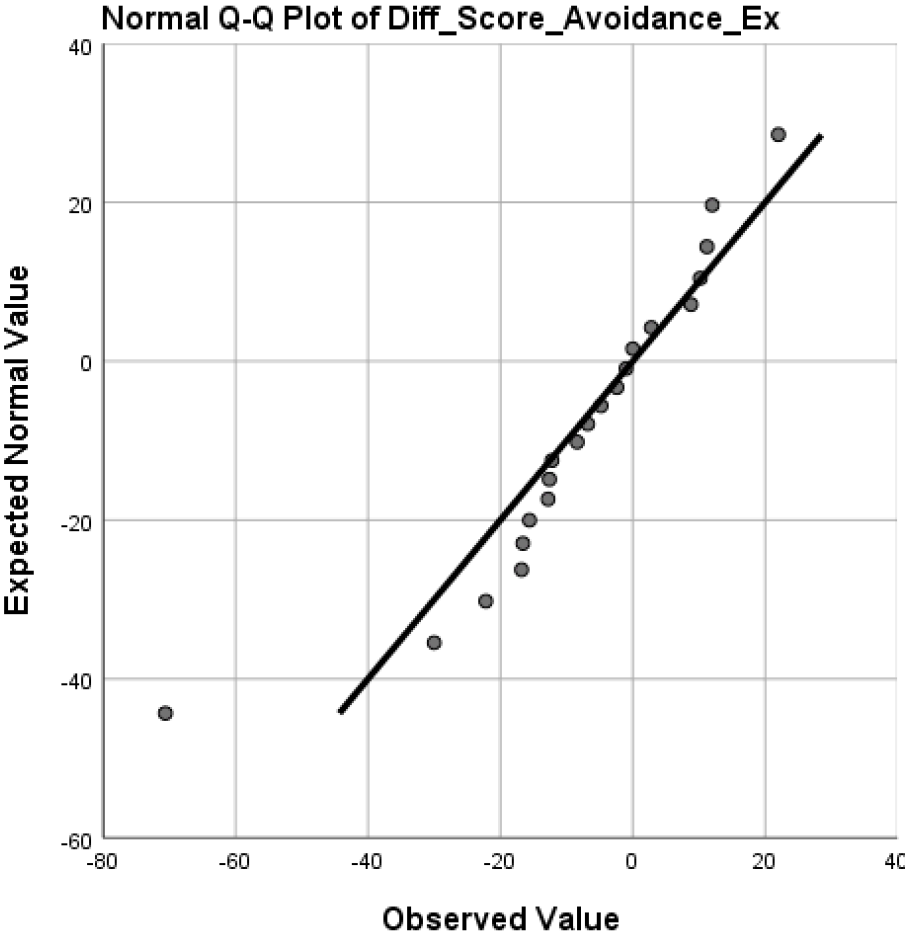
Appendix A

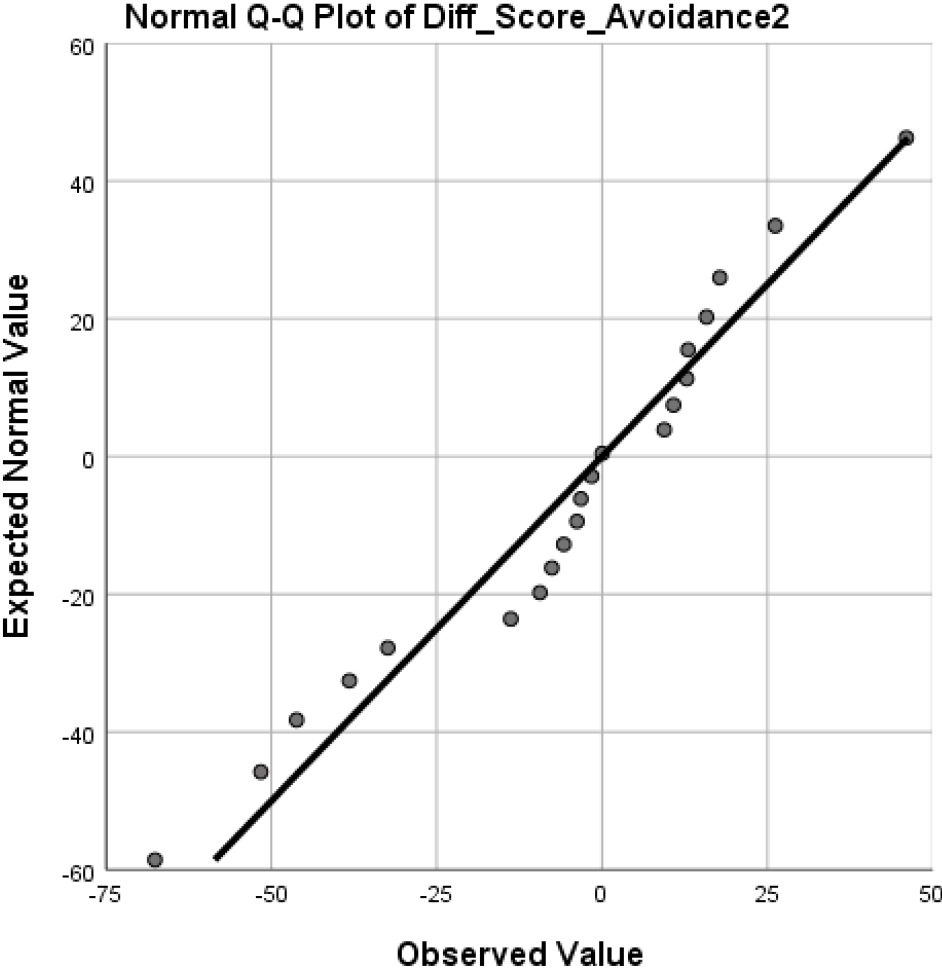
Assumption Check (Normality)

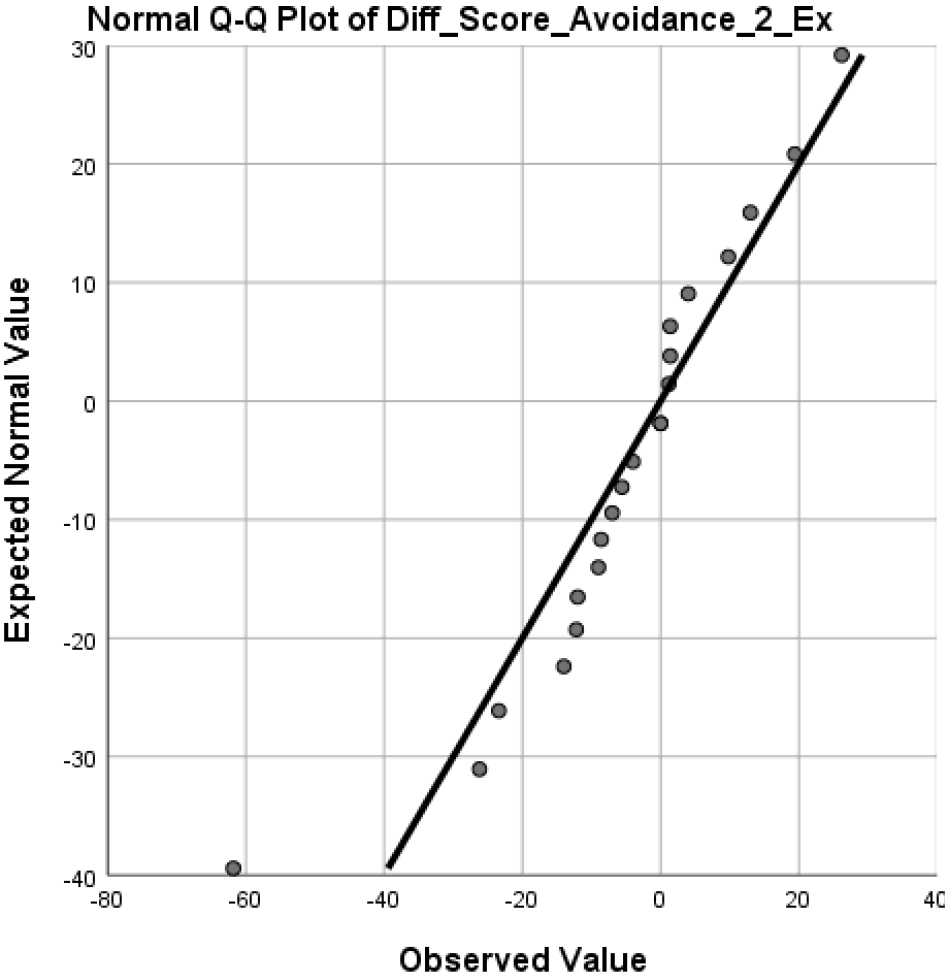


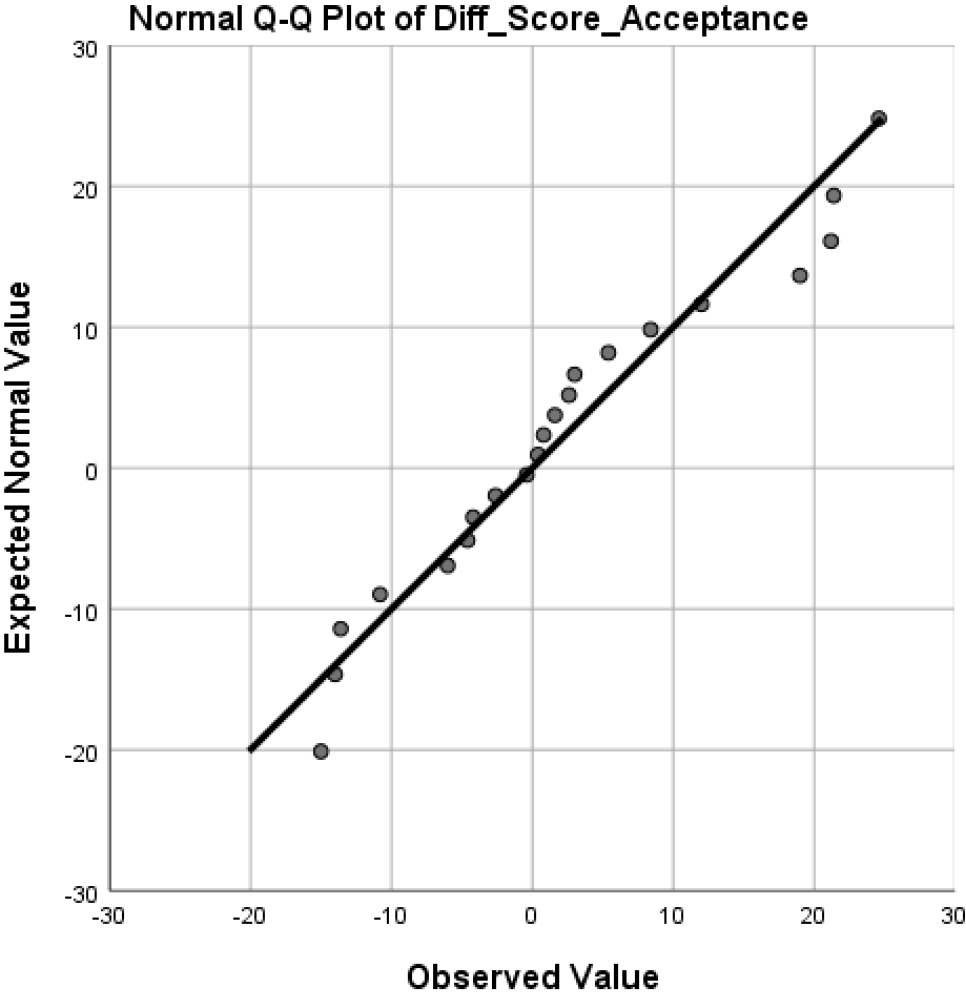


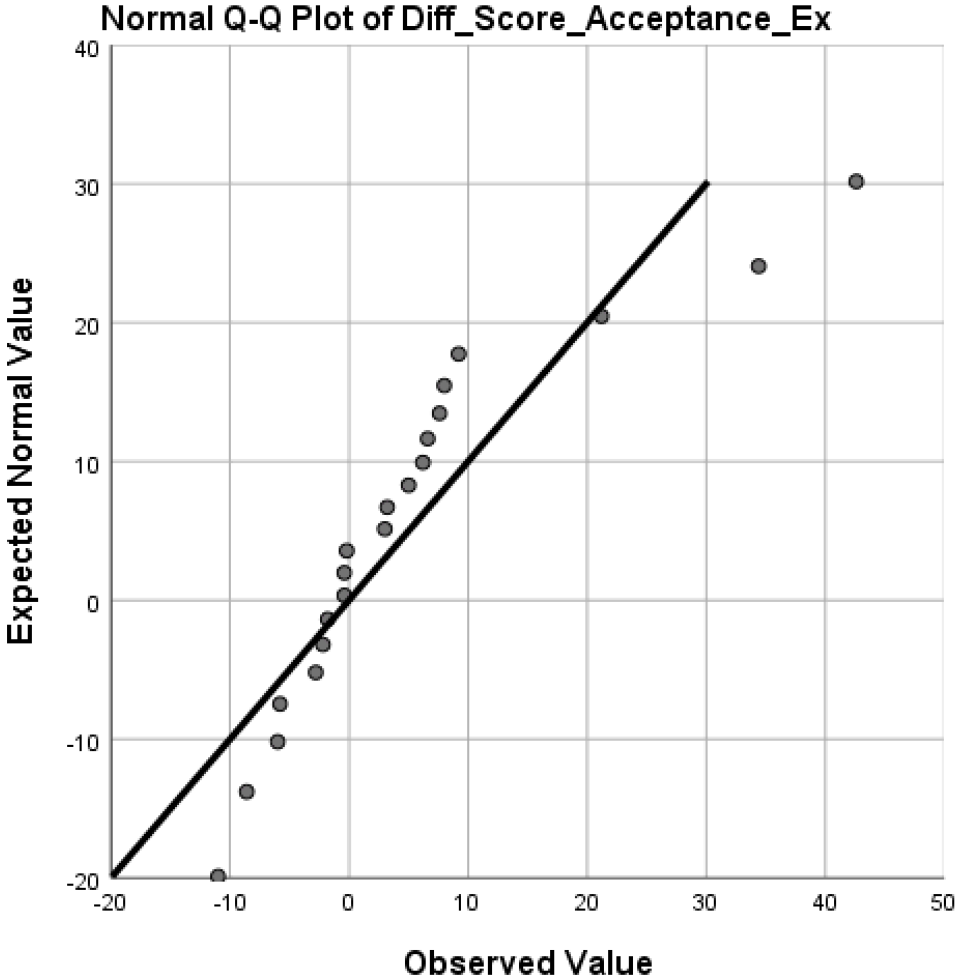




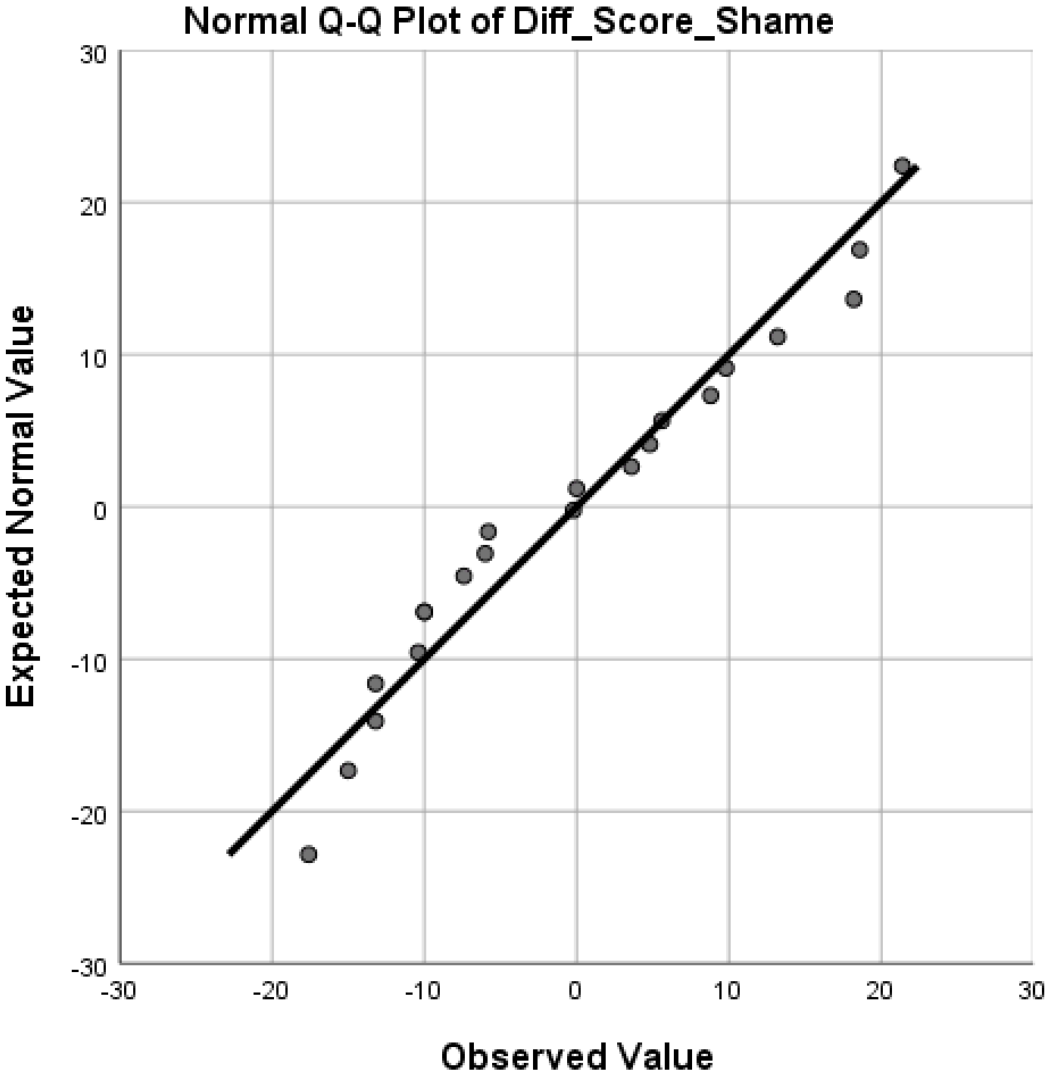


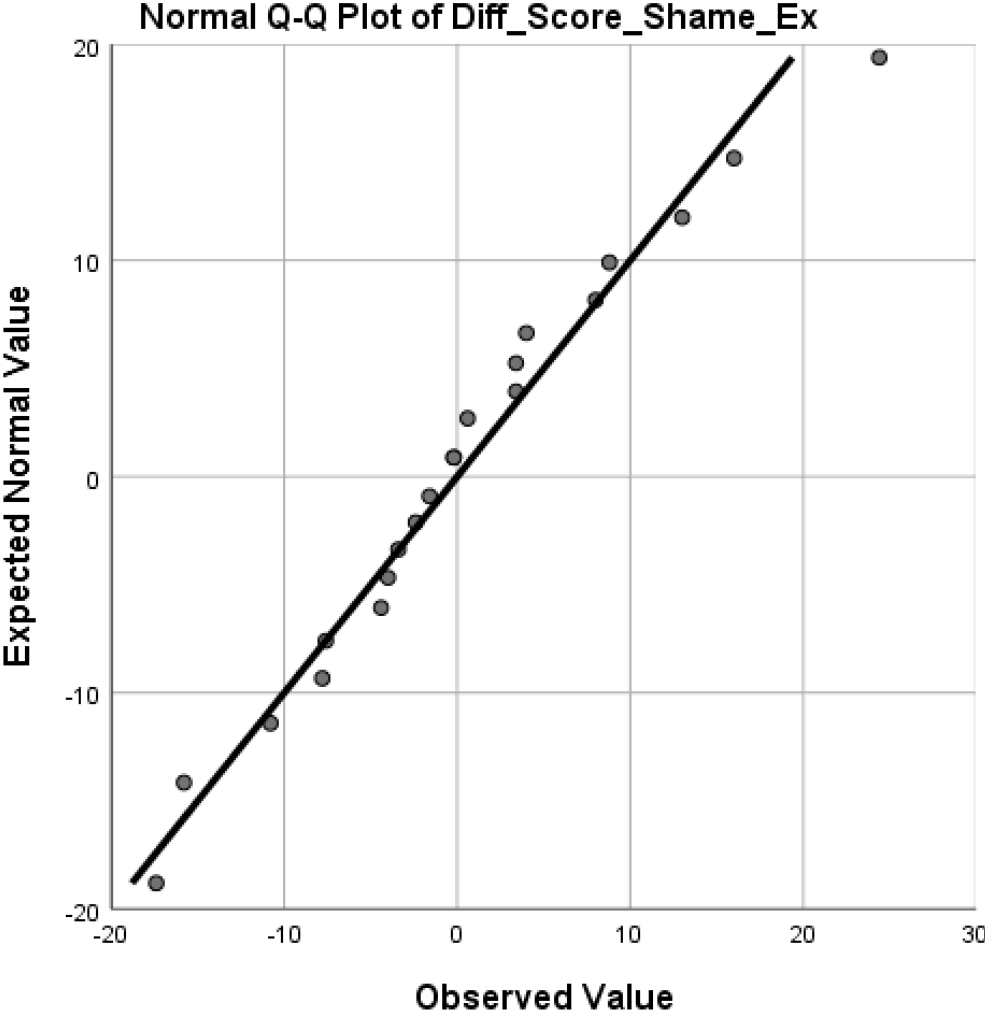












## Appendix B

# T2

### Participant Leaflet

#### “A trip down memory lane”

PSY-1920-S-0050

#### The Research & Contact Details

The research project (period: 24-02-2020 - 15-05-2021) was approved by the Ethical Committee of Psychology (ECP) of the University of Groningen (contact: [ecp@rug.nl](mailto:ecp@rug.nl)). The study is supervised by Paula von Spreckelsen (p.von.[spreckelsen@rug.nl](mailto:spreckelsen@rug.nl)).

#### Debriefing

In this study we want to investigate the effect of repeated exposure to negative body-related memories on body image concerns. In line with the literature on exposure interventions, the hypothesis of the study is that due to repeated exposure to aversive memories, negative emotional reactions to these memories will decrease. In other words, the memories becoming less potent to elicit negative feelings, particularly disgust. Because negative emotions decrease, we hypothesize that this allows participants to become more accepting of and less dissatisfied with their bodies. Please do not share the aim of this study with other participants, as it is important that participants do not know about our hypotheses.

#### Possible Negative Effects

In this study, we ask participants to give detailed descriptions and listen to recordings of negative memories that involve their own body. This means that you likely experienced negative emotions during the study. If you experience any adverse effects due to the study, please contact the PI ([p.von.spreckelsen@rug.nl](mailto:p.von.spreckelsen@rug.nl); 050-36 34848). You can also make an appointment with the student psychologist via the Student Service Centre (Uurwerkersgang 10, Groningen; +31(0)50 363 8066; [ssc-info@rug.nl](mailto:ssc-info@rug.nl)). If you have questions or concerns regarding your rights as a research participant, you can also contact the Ethics Committee Psychology of the University of Groningen ([ecp@rug.nl](mailto:ecp@rug.nl)).