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Dimensions of Control and symptoms of eating pathology

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Abstract

Background. Eating pathology is suggested to be related to several dimensions of control, such as lower sense of control and higher fear of losing control. Eating disorders have a high comorbidity with anxiety disorders, and several underlying mechanisms are thought to contribute to this overlap, one of them being anxiety control. This study investigated the relationship between self-control, desire for control, anxiety control and inhibitory control, and symptoms of eating pathology.

Method. Fifty women of 18+ years were recruited in the community. They filled out questionnaires measuring eating pathology, self-control, desire for control, anxiety control and general information such as age, they completed the Go/No-Go Task measuring inhibitory control, and their length and weight was measured.

Results. Multiple regression analyses showed no significant relation between the control measures and symptoms of eating pathology. Furthermore, no significant relation was found between self-control and inhibitory control. However, a trend was found in the relation between self-control and symptoms of eating pathology, and a relation was found between anxiety control and desire for control.

Discussion. No relations were found between symptoms of eating pathology and several dimensions of control. As the inconsistencies in the related literature are mainly due to methodological differences, the current findings could be explained by the limited variance in symptoms of eating pathology. The trend between self-control and symptoms of eating pathology could indicate that people with more symptoms of eating pathology have less self-control. Furthermore, the found relation between desire for control and anxiety control suggests that less anxiety control predicts more desire for control. It would be interesting for future research to further investigate this relation in the context of eating pathology.

Keywords: eating pathology, self-control, desire for control, anxiety control, inhibition

Eating Pathology and Dimensions of Control

Over the years, an increasing amount of research has focused on cognitive factors that are associated with eating disorders, such as cognitive flexibility (set-shifting; Tchanturia et al., 2011), decision making (Pignatti & Bernasconi, 2013), and also control (Tiggemann & Raven, 1998). Control issues are clearly visible on a behavioral level and are described by the diagnostic criteria of eating disorders in the DSM-5 (American Psychiatric Association, 2013), such as weight restriction (“over-controlling” ones weight by reducing food-intake, or by exercising or purging; see also Donovan & Penny, 2014), bingeing (characterized by a sense of lack of control over eating) or food restriction without the aim of controlling ones weight (i.e., eating an extremely healthy diet). As control is a broad construct, it entails many different concepts (Skinner, 1996). Several of these are investigated in relation to eating pathology, such as self-control (Tangney, Baumeister, & Boone, 2004; Tiggemann & Raven, 1998), fear of losing control (Froreich, Vartanian, Grisham, & Touyz, 2016) and inhibitory control (Bartholdy, Dalton, O’Daly, Campbell, & Schmidt, 2016).

Sense of control, fear of losing control, and desire for control

Froreich and colleagues (2016) investigated the relation between eating pathology and six dimensions of control: locus of control, sense of control, fear of losing control, desire for control, sense of mastery, and ineffectiveness. The results suggest that people with more symptoms of eating pathology tend to have a lower sense of control, more feelings of ineffectiveness and more fear of losing control. Contrary to their hypotheses and findings of earlier research by other researchers (Jarman, Smith, & Walsh, 1997), their findings did not support the idea that people with more symptoms of eating pathology have more desire for control (Froreich et al., 2016). This is consistent with earlier research of Tiggemann and Raven (1998) who found that women suffering from an eating disorder (anorexia nervosa:

AN, and bulimia nervosa: BN) actually have less desire for control than healthy controls, and therefore they concluded that the desire for control over food and weight is not part of a more general desire for control. A possible explanation could be that people with more symptoms of eating pathology tend to compensate for their feelings of lack of control and ineffectiveness by exercising control over their eating pattern. This compensation strategy could be interpreted as a high desire for control, but the desire for control could be realistic if people with more symptoms of eating pathology actually do have less (self-) control. In this case the realistic desire for control would increase controlling behavior to compensate for the actual problems with (self-) control. In other words, the desire for control might have a moderating role between eating pathology and self-control.

Anxiety control

Eating disorders have been associated with fear, anxiety in general, and distress (Raykos, Byrne, & Watson, 2009). Moreover, research has shown an overlap between eating disorders and anxiety disorders (Pallister & Waller, 2008). Swinbourne and colleagues (2012) investigated this overlap and found that women who suffer from an eating disorder are more likely to have a comorbid anxiety disorder than healthy controls, especially social phobia, posttraumatic stress disorder¹, generalized anxiety disorder and agoraphobia. The majority of the eating disordered women reported that their anxiety disorder preceded the eating disorder. Pallister and Waller (2008) found that women with the restrictive eating disorder type are more likely to suffer from a comorbid obsessive-compulsive disorder². Their study suggests that this overlap might be explained by common factors, such as safety behavior (rigidity, checking behavior and avoidance), cognitive avoidance strategies (cognitive narrowing and

¹ Posttraumatic stress disorder (PTSD) is no longer listed as an anxiety disorder in the DSM-5, as there is a separate chapter for trauma and stressor-related disorders (see also: Weathers, 2017). However, anxiety is an important component of PTSD (Friedman, Resick, Bryant, Strain, Horowitz, & Spiegel, 2011).

² Obsessive-compulsive disorder is no longer listed as an anxiety disorder in the DSM-5, as there is a separate chapter for obsessive-compulsive and related disorders (see also: Van Ameringen, Patterson, & Simpson, 2014).

blocking) and common aetiological factors (Pallister & Waller, 2008). An example of a common aetiological factor between social phobia and eating disorders is the childhood fear of being negatively judged by others, which can lead to a fear of being negatively judged for weight or shape (Schwalberg, Barlow, Alger, & Howard, 1992). Grabhorn and colleagues (2006) investigated social anxiety in AN and BN and found that shame is a mediating role between performance anxiety and social interaction anxiety, and BN (Grabhorn, Stenner, Stangier, & Kaufhold, 2006). They elaborate that eating disordered behavior could serve as a strategy to influence appearance with the aim to avoid negative judgment about the body.

Another explanation of the high comorbidity between eating disorders and anxiety disorders is that people with eating disorders tend to have more problems with emotion regulation than healthy controls (Harrison, Sullivan, Tchanturia, & Treasure, 2010). Danner and colleagues (2014) investigated emotion regulation in different types of eating disorders and their findings suggest that people suffering from an eating disorder tend to suppress their emotions, and use less cognitive reappraisal than healthy controls. Cognitive reappraisal is a strategy to reduce the negative impact of the emotion and therefore it could prevent impulsive emotional eating. As people with eating disorders have difficulty with cognitive reappraisal (Danner, Sternheim, & Evers, 2014), they might look for other strategies to avoid negative emotions, such as fear, and use their eating disorder as a coping mechanism (e.g. bingeing or food restraint; Lampard, Byrne, McLean, & Fursland, 2011). These findings suggest that people with eating pathology feel as if they do not have control over their emotions or over others in fearful situations. Rapee and colleagues (1996) describe this construct as anxiety control: the perceived control over anxiety-related events and anxiety-related (emotional) reactions. Although potentially very important, this construct as described by Rapee et al. (1996) has, however, not been thoroughly researched in the context of eating pathology yet. Fiore and colleagues (2014) investigated the relation between emotion dysregulation, anxiety

control and drive for thinness, which is part of eating pathology, in particular AN, and found that anxiety control mediated the relation between emotional dysregulation and drive for thinness. The present study investigates whether anxiety control is related to symptoms of eating pathology in general.

Inhibitory control

As people with symptoms of eating pathology report that they have poor self-control (Froreich et al., 2016), an interesting question is whether this is based on actual problems with self-control or whether it is merely the feeling of not having control. Yano and colleagues (2016) investigated the extent to which people with eating disorders are able to control their behavior by being able to inhibit prepotent motor responses, in other words, whether they have inhibitory control. They measured the ability to inhibit motor responses in people with eating disorders, using a Go/No-Go Task, which is a task that requires either a quick motor response or no response (Fillmore, Rush, & Hays, 2006). They found that people with eating disorders had more difficulty inhibiting their response than healthy controls. This could explain poor impulse control in eating behavior, and hence lower sense of control is at least partly based on an accurate feeling of not being able to control their behavior (Yano et al., 2016; Froreich et al., 2016). Galimberti and colleagues (2011) used the Stop Signal Task (Verbruggen, Logan, & Stevens, 2008) to measure the difference in response inhibition between two types of eating disorders (AN and BN) and healthy controls. They found that only patients suffering from AN had more difficulty with response inhibition than healthy controls (Galimberti, Martoni, Cavallini, Erzegovesi, & Bellodi, 2011). These findings are surprising because BN is characterized by experienced loss of control during binges, while AN, the restricting subtype in particular, is characterized by “overcontrolling” behavior.

To conclude, the aim of this research is to investigate the relation between self-control, desire for control, anxiety control and inhibitory control in the context of eating pathology. It is hypothesized that a high desire for control, low self-control, and less anxiety control are associated with more symptoms of eating pathology. Additionally, desire for control is thought to moderate the relation between self-control and symptoms of eating pathology. Furthermore, it is hypothesized that self-control is highly correlated with inhibitory control, as is expected that feelings of inhibitory control are related to actual inhibitory control. Finally, it is hypothesized that low inhibitory control predicts more symptoms of eating pathology.

Methods

Participants

Fifty Dutch-speaking women of eighteen years and older participated in the study. Most of the participants were students who were recruited at the Uithof at Utrecht University, using flyers, posters or recruitment via verbal communication. They were offered participation points required during their curriculum, and a chance at winning a voucher of 30 euros. Other participants were recruited outside University, using social media.

Materials

Symptoms of eating pathology The Dutch version of the Eating Disorder Examination-Questionnaire (EDE-Q) of Fairburn and Beglin (1994) was used (Van Furth, 2000). This questionnaire consists of 36 questions that focus on eating disordered behavior in the last four weeks (28 days), using a 7-point Likert scale for the amount of days in which a certain behavior occurred ranging from *not a single day* to *every day*, a binary scale to either confirm or deny certain eating disorder-related behavior, and a 7-point Likert scale to indicate

how strongly one agrees with a statement, ranging from *not at all* to *strongly*. A higher score indicates more symptoms of eating pathology. The questionnaire generates scores on a global scale and on the subscales Restraint, Eating Concern, Shape Concern and Weight Concern.

For the use of this study only the global scale (general eating pathology) was used.

Cronbach's alpha for this scale was .91.

Desire for control The Dutch version of the Desirability of Control Scale (DCS) of Burger and Cooper (1979) was used (Gebhardt & Bosschot, 2002), which consists of 18 questions asking about the desire to have control over others, the desire to hand over control to others, and the desire to control oneself. Participants had to indicate how strongly they agreed with a statement, using a 6-point Likert scale ranging from *strongly disagree* to *strongly agree*. A higher score indicates more desire for control. Cronbach's alpha in the present study was .78.

Self-control The Self-Control Scale (SCS) of Tangney and colleagues (2004) was used to measure self-control, which is translated to Dutch (Kuijer, de Ridder, Ouweland, Houx, & van den Bos, 2008). This questionnaire consists of 36 items and three subscales that measure Inhibition, Goal Monitoring, and Switching. Participants had to state how strongly a statement applied to them, using a 5-point Likert scale, ranging from *not at all like me* to *very much like me*. A higher score indicates less self-control. The global scale and the inhibition subscale were used, the reason for using this subscale being that it would be expected to have overlap with objectively measured inhibition. Cronbach's alpha for the global scale was .90, and .81 for the inhibition subscale.

Anxiety control The Anxiety Control Questionnaire (ACQ) of Rapee et al. (1996) was used to measure anxiety control. The English version was translated to Dutch by the investigator and then re-translated to English by a different person to check whether the second translations differed from the original questionnaire (a so-called translation back-

translation procedure). Sentences were adjusted into a more comprehensible form and afterwards checked by another investigator. The questionnaire contains 30 statements about perceived control over anxiety related events and anxiety related (emotional) reactions. Participants had to indicate whether they agreed with a statement, using a 6-point Likert scale ranging from *strongly disagree* to *strongly agree*. A higher score indicates more anxiety control. Cronbach's alpha in the present study was .90.

Inhibitory control The Go/No-Go Task was used to measure inhibitory control (Fillmore et al., 2006), using Inquisit 4 software (Millisecond, 2016). Participants were asked to look at the fixation point on the screen, which appeared for 800 ms. and was followed by a white rectangle (either horizontal or vertical) that would turn either green or blue within 500 ms. Participants were instructed to press the spacebar as fast as possible if the rectangle turned green (Go) and to not do anything if it turned blue (No-Go). The aim was to react as fast as possible, but also to make as few mistakes as possible. The colored rectangle was displayed for 1000 ms and then disappeared for 700 ms, after which the next trial started, starting with the fixation point. The task consisted of 250 trials, of which 125 Go-trials (100 vertical and 25 horizontal) and 125 No-Go-trials (100 horizontal and 25 vertical). The task lasted approximately 10 minutes.

General characteristics Some general information was gathered: age, number of years one has had an education counting from the year in which one learned to read and calculate in class ("groep 3" or "eerste klas", depending on how long ago this was), and whether one has ever been diagnosed with an eating disorder. Furthermore, length and weight were measured by the investigator using a weighing scale and a measuring tape to determine BMI (in kg/m^2).

Procedure

Participants were asked to come to the lab of the department of Clinical Psychology or to a quiet room elsewhere, where they were asked to read the information letter, and consequently fill out the informed consent form if they agreed to participate and had no further questions (in which case these would be answered first). They gave their name and email in order to participate in the lottery for the voucher, and if they wanted to earn participation points of the university, they had the option to check the corresponding box. Participants were assured of their anonymity. They were explained that they would start filling out the questionnaires, respectively the EDE-Q, DCS, SCS, ACQ and some general questions (e.g. age, education), using Google Forms. They were told that they could ask for clarification if needed. Since the first couple of participants asked questions about two specific items (question 1 of the EDE-Q and the question about education in the general information form), it was decided to give an extended instruction of the questionnaires to the subsequent participants, clarifying these questions in particular. After having finished the questionnaires, participants were instructed how to perform on the Go/No-Go Task, mainly because there was no practice trial. Once finished, participants were asked to take off their shoes so that the investigator could measure their length in meters and weight in kilograms.

Statistical analysis

A descriptive analysis was conducted for all variables. Pearson's product-moment correlation coefficients were used to indicate correlations between the variables. Additionally, multiple regression analyses were conducted to determine the predictive properties of desire for control, self-control and anxiety control for symptoms of eating pathology, and a moderation analysis was executed to measure the moderating role of desire for control on the predictive property of self-control for symptoms of eating pathology. Furthermore, multiple

regression analyses were conducted to determine the predictive role of inhibitory control for self-control, of inhibitory control for the inhibitory subscale of the SCS, and of inhibitory control for symptoms of eating pathology.

Results

Descriptive data

Descriptive analyses were conducted for all variables and can be found in Table 1. Furthermore, three participants indicated to have been diagnosed with an eating disorder in the past, all three with AN and one of them also with an eating disorder not otherwise specified (EDNOS). Nine participants scored above the cut-off score that indicates a strong possibility of an eating disorder ($EDE-Q \geq 2.3$; Mond, Hay, Rodgers, Owen, & Beumont, 2004).

Table 1 *Descriptive statistics*

	<i>M (SD)</i>	<i>Range</i>	
		<i>Minimum</i>	<i>Maximum</i>
Age	25.54 (10.49)	18	58
Education	14.98 (2.36)	8	22
BMI	22.28 (3.33)	17.36	31.49
Error	1.52 (1.63)	0	8
Reaction time	365.80 (26.76)	311.24	453.57
EDE-Q	1.41 (.87)	.11	3.91
SCS_T	2.70 (.52)	1.86	3.92
SCS_I	2.68 (.61)	1.67	4.42
DCS	4.05 (.87)	2.61	5.61
ACQ	1.92 (.66)	.83	3.43

Note. Age and education measured in years, BMI = Body Mass Index (in kg/m²), Reaction time measured in ms, EDE-Q = Eating Disorder Examination-Questionnaire, SCS_T = total Self-control Scale, SCS_I = inhibitory subscale of the SCS, DCS = Desirability of Control Scale, ACQ = Anxiety Control Scale. *N* = 50.

Correlation analyses

The relationships between the questionnaires (EDE-Q, DCS, SCS and ACQ), the Go/No-Go Task, age, BMI and years of education were measured using the Pearson product-moment correlation coefficient, after checking for normality, linearity and homoscedasticity, and can be found in Table 2. Surprisingly, no correlations were found between eating pathology and any of the other measurements. However, a trend was found in the relation between symptoms of eating pathology and self-control, $r = .25$, $p = .082$, which indicates that more symptoms of eating pathology might be related to lower self-control. Interestingly, no correlations were found between the global scale of self-control and inhibitory control, $r = .016$, $p = .91$, nor between the inhibition subscale of self-control and (actual) inhibitory control, $r = .12$, $p = .40$, indicating a discrepancy between experienced and actual inhibitory

control. Significant correlations that are worth mentioning were found between desire for control and anxiety control, between desire for control and the inhibition subscale of self-control, and between anxiety control and inhibitory control.

Table 2 *Pearson product-moment correlation coefficient*

	<u>Education</u>	<u>BMI</u>	<u>Error</u>	<u>RT</u>	<u>EDEQ</u>	<u>SCS_I</u>	<u>SCS_T</u>	<u>DCS</u>	<u>ACQ</u>
Age	-.011	.38**	-.092	.53***	-.093	-.035	-.20	-.27	-.058
Education		-.088	-.12	-.12	-.031	.089	.043	.26	-.012
BMI			.048	.072	.24	.047	-.040	.042	-.143
Error				-.082	.020	.12	.016	.12	-.291*
RT					-.062	-.22	-.21	-.19	.080
EDEQ						.13	.25	.13	.19
SCS_I							.82***	.31*	.044
SCS_T								.11	.26
DCS									-.30*

Note. BMI = Body Mass Index (kg/m^2); RT = mean reaction time on Go-cues; Error = total amount of errors made during the Go/No-Go Task measuring inhibitory control; EDEQ = total scale of EDE-Q, high scores indicate more symptoms of eating pathology; SCS_I = inhibition subscale of the SCS, high scores indicate low (self-reported) inhibitory control; SCS_T = total scale of the SCS, high scores indicate low self-control ; DCS = total scale of desire for control, high scores indicate more desire for control; ACQ = total scale of anxiety control, high scores indicate high control over anxiety. N = 50.

*Significant at $p < .05$.

**Significant at $p < .01$.

***Significant at $p < .001$.

Regression Analyses

Symptoms of eating pathology and control questionnaires Multiple regression was used to assess the ability of desire for control, self-control and anxiety control (DCS, SCS and ACQ) to predict symptoms of eating pathology (EDE-Q), after assuring no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Although correlations were found between symptoms of eating pathology and self-control, $r = .25$, $p = .041$, and a trend in the correlation between eating pathology and anxiety control, $r = .19$, $p = .088$, no significant results were found that would indicate that the control measures combined

explain the variance in symptoms of eating pathology, $R^2 = .10$, $F(3, 46) = 1.79$, $p = .16$.

Furthermore, no significant results were found for desire for control, $b = .17$, $t = 1.13$, $p = .26$, self-control, $b = .18$, $t = 1.20$, $p = .24$, or anxiety control, $b = .20$, $t = 1.23$, $p = .20$, to explain the variance in symptoms of eating pathology.

Additionally, a moderation analysis was used to assess whether desirability of control (DCS) influenced the relationship between self-control (SCS) and symptoms of eating pathology (EDE-Q). No significant results were found for the explained variance of the model, $R^2 = .073$, $F(3, 46) = 1.62$, $p = .20$. Desire for control was not a significant predictor for symptoms of eating pathology, $b = .10$, $t = .45$, $p = .65$, and although self-control was not a significant predictor either, a trend was found, $b = .24$, $t = 1.90$, $p = .06$. Furthermore, The interaction between desire for control and self-control had no significant influence on symptoms of eating pathology, $R^2 < .001$, $F(1, 46) = .019$, $p = .89$.

Symptoms of eating pathology, self-control and inhibitory control Multiple regression was used to assess if inhibitory control on the Go/No-Go Task (error and reaction time) is able to statistically predict self-control as measured by the questionnaire (SCS), after assuring no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Error and reaction time did not explain the variance of the model, $F(2, 47) = 1.081$, $p = .35$. No variance in self-control was explained by error, $b = -.002$, $t = -.011$, $p = .99$, nor by reaction time, $b = -.21$, $t = -1.47$, $p = .15$.

Since the inhibition subscale of the SCS was expected to be even more closely related to actual inhibitory control on the Go/No-Go Task, this analysis was repeated for the ability of actual inhibitory control to predict inhibitory control on the subscale. No significant results were found to explain the variance in the model, $R^2 = .058$, $F(2, 47) = 1.46$, $p = .24$, and no variance in inhibitory control on the subscale of the SCS was explained by error, $b = .10$, $t = .74$, $p = .47$, nor by reaction time, $b = -.21$, $t = -1.47$, $p = .15$.

Finally, multiple regression was used to assess the ability of inhibitory control (error and reaction time) to predict the variance in symptoms of eating pathology (EDE-Q). Error and reaction time were no significant predictors of the model, $R^2 = .004$, $F(2, 47) = .095$, $p = .91$. No significant results were found when assessing the predictive property of error to explain variance in symptoms of eating pathology, $b = .015$, $t = .10$, $p = .92$, and similarly no significant results were found for the predictive role of reaction time, $b = -.06$, $t = -.41$, $p = .68$.

Discussion

This study investigated the relation between symptoms of eating pathology and several dimensions of control. It was hypothesized that people with less self-control, more desire for control and less anxiety control would show more symptoms of eating pathology, and that the role of self-control in symptoms of eating pathology would be moderated by desire for control. The results showed no significant results, suggesting no such relation. This is in line with previous studies that reported no relation between eating pathology and desire for control (Foreich et al., 2016; Tiggemann & Raven, 1998). Although self-control was not a significant predictor of symptoms of eating pathology, the results showed a trend effect that lower self-control was related to more symptoms of eating pathology, again similar to the results of Foreich et al. (2016), and also similar to the results of Boisseau and colleagues (2012), who found that eating pathology was related to higher levels of impulsivity (Boisseau, Thompson-Brenner, Caldwell-Harris, Pratt, Farchione, & Barlow, 2012).

The expectation that desire for control is a moderator of the relation between self-control and symptoms of eating pathology was not confirmed. A different approach to the role of desire for control could be that this desire itself is not different in people with more symptoms of eating pathology, but that the strategies to achieve this desired control are.

Given the findings that lower self-control might be related to symptoms of eating pathology, the desire for control could be a realistic consequence. People with symptoms of eating pathology might lack the adaptive skills to adequately achieve more self-control because they feel ineffective and experience a lack of self-control (Froreich et al., 2016). For example, a woman with eating pathology might have the feeling that other people do not take her opinions into account. She might use her eating disordered behavior, such as dieting, as a strategy to feel more in control of her life. Although she might feel more in control, a more adequate strategy would be to practice more assertive behavior. This would implicate that therapy should not necessarily focus on reducing the desire for control, but on the strategies that are used to achieve this control and/or on the feelings of lack of control.

Another explanation of the results would be that people with more symptoms of eating pathology use their eating disordered behavior as a way to satisfy their desire for control and therefore experience less desire for control. It would be interesting to investigate if desire for control would increase when people with more symptoms of eating pathology would start reducing their eating disorder-related controlling behavior. One could hypothesize that reducing this behavior would lead to more feelings of lack of control, considering that their pathological eating behaviors serve the function of reducing these feelings, and therefore the desire for control would be likely to increase.

Furthermore, it was hypothesized that objective measures of inhibitory control (outcomes on the Go/No-Go task) would be related to subjective measures of inhibitory control (inhibitory subscale of the SCS). However, no significant relation was found, which suggests that self-control is not experienced in the same way as it is executed, and therefore these findings suggest that self-reflection about behavior differs from actual behavior. This could be explained by the fact that inhibitory motor control is only one aspect of self-control and participants might not consider motor inhibition very important to their feelings of self-

control. They might focus more on cognitive or emotional control, such as the ability to control ones anger or to concentrate on reading a book. Also, it could be possible that inhibitory motor control in daily life is influenced by other (possibly more complex) processes. For example, one could imagine that it would be difficult for someone with symptoms of eating pathology to stop eating during a bingeing episode when that person uses bingeing as a strategy to regulate emotions, or when the bingeing occurs after a few days of starving.

The results also show that inhibitory control is unrelated to symptoms of eating pathology. This contradicts the study of Yano et al. (2016) that showed that eating disordered patients experience more difficulties with response inhibition, using a similar task as in the present study (Yano et al., 2016). However, Batholdy et al. (2016) compared multiple studies that investigated this relation and concluded that the results are inconsistent, mainly due to methodological differences, such as differing inclusion criteria. The current study focused on different levels of symptoms of eating pathology in a community sample, and participants scored relatively low on the EDE-Q, which could explain the difference in results with the study of Yano et al. (2016), as their sample showed more variance of eating pathology.

An interesting result was that desire for control was related to anxiety control, which indicates that feelings of lack of control in anxiety-related events and (emotional) reactions predict more desire for control. An explanation could be that desire for control is mainly determined by anxiety related events and (emotional) reactions. The relation between desire for control and anxiety has been investigated by Wilkinson and Chamove (1992). They found that increased levels of anxiety are related to a bigger discrepancy between the amount of control a person perceives to have, and the amount of control a person thinks he/she ought to have. This discrepancy was even stronger in women suffering from an anxiety disorder (Wilkinson & Chamove, 1992). Another concept that could explain the relation between

desire for control and anxiety control is intolerance of uncertainty (IU), as described by Sternheim and colleagues (2011). They elaborate that uncertain situations lead to anxiety and feelings of being out of control. As they investigated IU in people with an eating disorder, they found that people with an eating disorder tend to have higher IU. One could imagine that intolerance of situations that lead to feelings of anxiety and lack of control would increase a need for more control. Therefore, it would be understandable that more IU is associated with a higher desire for control. Although the relation between desire for control and anxiety control was unrelated to symptoms of eating pathology in the present study, it would be interesting for future research to investigate this relation in the context of eating pathology. It would also be interesting to investigate whether the construct of desire for control has a subcategory that is related to eating pathology. For example, people with more symptoms of eating pathology might have more desire for anxiety control in specific, but not more desire for control in general. As there is a strong comorbidity between eating disorders and anxiety disorders (Pallister & Waller, 2008), a focus for therapy might be to achieve better anxiety control, because this could reduce the desire for control, hence a reduced need to maintain eating disordered behavior. Better anxiety control could be achieved by cognitive behavioral therapy (CBT), which was found effective in children suffering from anxiety (Muris, Mayer, Den Adel, Roos, & Van Wamelen, 2009), an anxiety control training (Snaith, Owens, & Kennedy, 1992), or the use of relaxing music (Elliot, Polman, & McGregor, 2011).

Limitations

A few characteristics of this study should be taken into consideration. First, the majority of the participants were psychology students from the university and therefore the sample might not resemble the community, as it does not account for people with lower education, older and younger age, or people with a different choice of study. Second, the

study focused only on women and therefore the study cannot be generalized to men. Third, the majority of the participants scored very low on the EDE-Q, which caused low variance in symptoms of eating pathology. It might be interesting to repeat this study and compare a clinical to a healthy control group, to assure a more accurate reflection of the influence of eating pathology and it would therefore be useful for therapeutic purposes. Additionally, the power of the study was relatively small due to the number of analyses that were performed. A larger sample would provide more certainty about the study findings, based on the central limit theorem, that states that when you have a large sample, the distribution of the sample mean will become normal (Moore, McCabe, & Craig, 2009), and therefore show more variance.

Furthermore, eating pathology was used as a broad concept. One could expect differences in the role of dimensions of control between the different types of eating pathology, as was demonstrated by study of Galimberti et al. (2011), who found more problems with motor inhibition in patients with AN than in patients with BN. It would be interesting to further investigate these differences.

Conclusions

To conclude, this study contributes to the research of eating pathology and dimensions of control. Although no significant relations were found between symptoms of eating pathology and dimensions of control, self-control seems to be related to symptoms of eating pathology. The non-significant results suggest that there is no relation between desire for control, anxiety control or inhibitory control and symptoms of eating pathology, and that subjective self-control differs from actual inhibitory control. There seems to be a relation between the constructs of desire for control and anxiety control, which would be an interesting relation for future research to investigate in the context of eating pathology.

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Appendix A

Information Letter

Proefpersoneninformatie voor deelname aan wetenschappelijk onderzoek

Controle en eetpathologie

Algemeen

Ik wil u vragen om mee te doen aan een wetenschappelijk onderzoek.

Meedoen is vrijwillig. Om mee te doen is wel uw schriftelijke toestemming nodig.

Voordat u beslist of u wilt meedoen aan dit onderzoek, krijgt u uitleg over wat het onderzoek inhoudt. Lees deze informatie rustig door en vraag de onderzoeker om uitleg als u vragen heeft. Heeft u na uw deelname aan het onderzoek nog vragen, kunt u deze per e-mail stellen aan de onderzoeker of aan de deskundige die aan het eind van deze brief genoemd worden. Ook kunt u bij hen terecht voor aanvullende informatie. Verder kunt u over het onderzoek praten met uw partner, vrienden of familie.

Belangrijk

Deelname aan dit onderzoek is vrijwillig. Wanneer u besluit mee te doen, kunt u op ieder moment kiezen om te stoppen. U hoeft hiervoor geen reden te geven.

Uw privacy blijft gewaarborgd. Persoonlijke gegevens worden geanonimiseerd en uitsluitend voor onderzoeksdoeleinden gebruikt. Uw gegevens worden 15 jaar bewaard.

Achtergrond van het onderzoek

Eetstoornissen worden geregeld in verband gebracht met het begrip 'controle'. Als voorbeeld kan worden gedacht aan een patiënt met anorexia nervosa die extreme controle uitoefent op

de inname van voedsel. Door dit te doen krijgt hij of zij het gevoel controle over iets te hebben, terwijl deze controle niet wordt ervaren in het leven buiten de eetstoornis. Controle is echter een breed begrip. Denk maar aan de (subtiele) verschillen die er tussen de volgende aspecten zitten: gevoel van controle, verlies van controle en zelfdiscipline. Over de rol van deze verschillende aspecten bij eetstoornissen is nog niet veel bekend. Om een completer beeld te krijgen van eetpathologie is het van belang de rol van deze aspecten in kaart te brengen. Hierdoor kunnen patiënten beter begrepen worden en kan dit mogelijkheden bieden voor het optimaliseren van de behandeling.

Focus en werkwijze van dit onderzoek

Dit onderzoek zal zich richten op verschillende aspecten van controle. U wordt eerst gevraagd om een aantal vragenlijsten in te vullen op de computer. Één vragenlijst gaat over uw eetgedrag en uw houding tegenover uw lichaam en eten, en de overige vragenlijsten gaan over controle. Daarna zal u gevraagd worden om een taak op de computer te doen, deze duurt ca. 10 minuten. De onderzoeker zal u meer over deze taak vertellen. Tenslotte zal de onderzoeker uw lengte en gewicht bepalen en uw leeftijd noteren.

Vergoeding

Studenten aan de UU kunnen door deel te nemen aan dit onderzoek **0,75 proefpersoonuur** verdienen. Geef dit aan bij de onderzoeker en noteer uw studenten-ID en naam op het formulier van de onderzoeker. Iedere proefpersoon maakt daarnaast kans een Voucher te winnen van www.bol.com ter waarde van **€30**. Indien u mee wil loten voor deze bon, dient u uw e-mailadres achter te laten bij de onderzoeker. De winnaar krijgt na afloop van het onderzoek een mail met daarin de productcode.

Tot slot

Wenst u op de hoogte te worden gehouden van de onderzoeksresultaten, kunt u dat aangeven op de lijst van de onderzoeker. U krijgt dan na afloop van het onderzoek een korte samenvatting van het onderzoek en de resultaten.

Indien u besluit mee te doen aan het onderzoek, kunt u de toestemmingsverklaring tekenen.

Bedankt voor uw tijd.

Met vriendelijke groeten,

Daphne van der Laak

Contactgegevens

Onderzoeker: Daphne van der Laak, student Psychologie MSc

Contact: d.g.vanderlaak@students.uu.nl

Begeleider en

deskundige: Dr. Unna Danner

Contact: u.n.danner@uu.nl

Appendix B

Informed Consent Form

Toestemmingsverklaring

- Ik heb de informatiebrief gelezen. Ook kon ik vragen stellen. Mijn vragen zijn voldoende beantwoord. Ik had genoeg tijd om te beslissen of ik meedoe.
- Ik weet dat meedoen vrijwillig is. Ook weet ik dat ik op ieder moment kan beslissen om toch niet mee te doen of te stoppen met het onderzoek. Daarvoor hoef ik geen reden te geven.
- Ik weet dat sommige mensen mijn gegevens kunnen inzien. Die mensen staan vermeld in deze informatiebrief.
- Ik geef toestemming voor het meten van mijn lichaamsgewicht en –lengte.
- Ik wil meedoen aan dit onderzoek.

Naam proefpersoon:

Handtekening:

Datum : __ / __ / __

Ik verklaar dat ik deze proefpersoon volledig heb geïnformeerd over het genoemde onderzoek.

Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de proefpersoon zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte.

Naam onderzoeker: D.G. van der Laak

Handtekening:

Datum: __ / __ / __

Appendix C

Dutch Translation Of The Anxiety Control Questionnaire (ACQ)

- 0: Helemaal niet mee eens
- 1: Gedeeltelijk niet mee eens
- 2: Een beetje niet mee eens
- 3: Een beetje mee eens
- 4: Gedeeltelijk mee eens
- 5: Helemaal mee eens

1. Ik ben meestal in staat bedreiging vrij gemakkelijk te ontwijken.
2. Hoe goed ik om kan gaan met moeilijke situaties is afhankelijk van of ik hulp van buitenaf krijg.
3. Wanneer ik onder spanning word gezet, verlies ik waarschijnlijk de controle.
4. Ik kan mijn angst meestal verborgen houden.
5. Wanneer ik gespannen ben door iets, is er meestal niets dat ik kan doen.
6. Mijn emoties lijken hun eigen leven te leiden.
7. Er is maar weinig wat ik kan doen om het oordeel van anderen over mij te beïnvloeden.
8. Of ik een beangstigende situatie succesvol kan ontvluchten, is bij mij altijd een kwestie van toeval.
9. Ik tril vaak oncontroleerbaar.
10. Ik kan zorgelijke gedachten meestal gemakkelijk uit mijn hoofd zetten.
11. Wanneer ik in een stressvolle situatie ben, kan ik mezelf tegenhouden te hard te ademen.

12. Ik kan meestal de mate waarin een situatie voor mij een bedreiging zou kunnen zijn beïnvloeden.
13. Ik kan mijn niveau van angst onder controle houden.
14. Er is maar weinig wat ik kan doen om beangstigende gebeurtenissen te veranderen.
15. De mate waarin een moeilijke situatie zichzelf oplost, heeft niets te maken met mijn handelingen.
16. Als iets mij kwaad zal doen, zal dat gebeuren ongeacht wat ik doe.
17. Ik kan me meestal ontspannen wanneer ik dat wil.
18. Wanneer ik gespannen ben, weet ik niet altijd zeker hoe ik zal reageren.
19. Meestal kan ik ervoor zorgen dat mensen me mogen als ik daar moeite voor doe.
20. De meeste gebeurtenissen die me angstig maken, zijn buiten mijn controle.
21. Ik weet altijd precies hoe ik zal reageren op moeilijke situaties.
22. Ik maak me geen zorgen wanneer ik angstig word in een moeilijke situatie, omdat ik vertrouwen heb in mijn vermogen om met die symptomen om te gaan.
23. Hoe mensen over me denken, is grotendeels buiten mijn controle.
24. Ik vind het meestal moeilijk met lastige problemen om te gaan.
25. Wanneer ik hoor dat iemand een ernstige ziekte heeft, maak ik me zorgen dat ik de volgende ben.
26. Wanneer ik angstig ben, vind ik het moeilijk me op andere dingen te focussen dan mijn angst.

27. Ik ben in staat even goed met onverwachte angst om te gaan als met angst die ik verwacht.
28. Ik denk soms, “Waarom zou ik überhaupt proberen met mijn angst om te gaan wanneer niets dat ik doe invloed heeft op hoe vaak of hoe intens ik het ervaar?”
29. Ik heb vaak het vermogen op te kunnen schieten met “moeilijke” mensen.
30. Ik zal conflict vermijden, omdat ik dit niet succesvol op kan lossen.