

# Validation of the Body Dysmorphic Screener of DSM-5 criteria (BDDS-5)

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## **Summary**

Body dysmorphic disorder is a psychiatric disorder with a substantial psychosocial impact, early age of onset and high patient delay. Many factors such as the overlap with eating disorders complicate the diagnostic process of BDD. To this end the BDDS-5 has been developed. This study aimed to establish the reliability and validity of the BDDS-5, and investigated whether an additional section for excluding an eating disorder could be removed. Results showed that the BDDS-5 had a good internal reliability (with the exception of one item), convergent and concurrent validity and proved that the additional eating disorder section could be omitted. Evidence of divergent validity however, could not be assumed. Possible explanations for unexpected results are provided, strengths and limitations of the study are discussed and suggestions are made for further research and the application of the BDDS-5 in clinical practice.

## Introduction

Body dysmorphic disorder is classified in the DSM-5 as an obsessive compulsive disorder and is characterized by preoccupation with one or more defects or flaws in physical appearance, which are believed to look ugly unattractive, abnormal or deformed. In order to fulfil the criteria, the perceived flaws are not observable or appear only slight to other individuals (criterion A). Furthermore, the individual must perform or have performed at one time during the course of the disorder repetitive behaviours or mental acts in response to the appearance concerns (such as excessive grooming or reassurance seeking) (criterion B). Lastly, criteria for BDD can only be met if the appearance preoccupation is not better explained by body fat or weight concerns in an individual whose symptoms meet the criteria of an eating disorder (criterion D) (American Psychiatric Association, 2014). BDD is relatively common, with prevalence rates ranging from 0.7 (Otto, Wilhelm, Cohen et al., 2001) to 2.4 (Koran, Abujaoude, Large et al., 2008). Despite of this it is known to be both time-consuming and chronic (Phillips, Nierenberg, Brendel et al., 1996). It also appears that the disorder is associated with high rates of suicidal ideation and suicide attempts (Phillips, Coles, Menard et al., 2005) and poor social and occupational functioning (Didie, Tortolani, Walters et al., 2006). An important point of attention is it has an early onset where patients are most likely to develop symptoms during adolescence (Veale, Gledhill, Christodoulou & Hodsoll 2016), and some cases have even been reported as early as eight years of age (Neziroglu, Borda, Khemlani-Patel et al., 2018).

Despite the substantial psychosocial impact of BDD, difficulty diagnosing the disorder remains as it takes an average of 16 years for the proper diagnosis to be made. One of the reasons for this is the fact that BDD patients are more likely to present themselves in medical settings where they hope to find a solution for their appearance dissatisfaction. Patients presenting themselves in a psychiatric setting are often not recognized because of the therapists' unfamiliarity with BDD characteristics (Gunstad & Phillips, 2003). The high levels of comorbidity and symptomological overlap between BDD and eating disorders further complicate providing patients with the correct diagnosis, with 45% of patients diagnosed with an eating disorder also screening positively for BDD (Dingemans, van Rood, de Groot, & van Furth, 2012).

Screening in populations at risk is way to improve the diagnostics of BDD and thereby provide patients with the necessary treatment. To this end the body dysmorphic disorder screener of DSM-5 criteria (BDDS-5) has been developed. The BDDS-5 (figure 1.1) consists of 12 questions dichotomous questions about BDD thoughts and behaviours, corresponding to the DSM-5 criteria (section A-D). In its present form it contains an additional section S (see figure 1.2) with five eating disorder screening questions aimed at further exploration of criterion D. This section has been added to ensure that patients will not screen positively for BDD in cases where an ED is a more appropriate diagnosis.

The following questions are about thoughts and feelings people can have about how they look (your appearance). Read each of the statements below and indicate whether it is true for you or not. If the statement is true for you, place a cross underneath 'true'. If the statement is not true for you, place a cross underneath 'not true'.

	True	Not true
<b>A1</b> I think I look strange or ugly	<input type="checkbox"/>	<input type="checkbox"/>
<b>A2</b> I keep thinking about the fact that I look strange or ugly	<input type="checkbox"/>	<input type="checkbox"/>
<b>A3</b> Others think that there is nothing wrong with my appearance, or they think that I shouldn't worry about it	<input type="checkbox"/>	<input type="checkbox"/>
<b>B1</b> I keep looking in the mirror because I am unsatisfied with how I look, or I purposely don't look in the mirror because I don't want to see that I look strange or ugly	<input type="checkbox"/>	<input type="checkbox"/>
<b>B2</b> I keep picking at my skin, or adjust my clothing because I am dissatisfied with how I look	<input type="checkbox"/>	<input type="checkbox"/>
<b>B3</b> I keep asking others if they think I look strange or ugly	<input type="checkbox"/>	<input type="checkbox"/>
<b>B4</b> I keep comparing my appearance with that of others	<input type="checkbox"/>	<input type="checkbox"/>
<b>C1</b> I feel bad because of the way I look	<input type="checkbox"/>	<input type="checkbox"/>
<b>C2</b> I refrain from doing certain things (like going out, dating, changing jobs or taking trips) because I am dissatisfied with my appearance	<input type="checkbox"/>	<input type="checkbox"/>
<b>C3</b> I find it hard to do things with others because I am dissatisfied with my appearance	<input type="checkbox"/>	<input type="checkbox"/>
<b>C4</b> I have difficulty with keeping my attention at work or during a conversation because I am dissatisfied with my appearance	<input type="checkbox"/>	<input type="checkbox"/>
<b>D</b> The only reason I am dissatisfied with my appearance is because I find myself too fat (too heavy) or too skinny (too light)	<input type="checkbox"/>	<input type="checkbox"/>

*Figure 1.1.* English translation of Section A-D of the BDDS-5

The following questions only pertain the **last four weeks**. Place a cross in the box that applies to you.

- S1 What is your weight at this moment? ...kg
- S2 How tall are you? ...cm
- |  | Yes                      | No                       |
|--|--------------------------|--------------------------|
| S3 Were you constantly scared that your weight would increase (you would become heavier/gain weight)?                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| S4 Have you eaten extreme amounts of food while feeling that you did not have control over your eating?                                  | <input type="checkbox"/> | <input type="checkbox"/> |
| S5 Have you purposely vomited, used laxatives or exercised compulsively in order to gain control over your weight or change your figure? | <input type="checkbox"/> | <input type="checkbox"/> |

THANK YOU

*Figure 1.2.* English translation of Section S of the BDDS-5

The BDDS-5 was developed to be as simple in terms of length and language use, meaning that individuals can administer it without prior psychiatric knowledge in places where BDD patients are likely present themselves. Additionally, it is suitable for both children (of eight years and older) and adults of low education levels merely by changing the examples given (school vs. work). Thereby a possible solution for the patient delay is provided.

However the BDDS-5 has some disadvantages in its current form. The inclusion of the questions in section S leads to a lack of unidimensionality as well as additional length which are not preferred for a screener. The content of section S is also unnecessarily burdensome and less suitable for children, because of questions related to weight and bingeing and purging behaviours. A screener without section S would thus be preferred.

The primary objective of the current study is to validate the BDDS-5 so that it can be used in clinical practice. The validating process consists of the determination of the factor structure and internal reliability, as well as the validity (convergent, divergent and concurrent) . The secondary objective is to investigate whether the screening question regarding criterion D alone is sufficient in order to establish whether the individual has an eating disorder, and whether their appearance dissatisfaction is better explained by this fact. Thus it will be investigated whether

section S could be omitted from the BDDS-5 without leading to a loss of possible or likely BDD cases.

The screener as it is now is aims to screen for two distinct disorders (BDD and ED), meaning that two factors are expected. As there are multiple questions to represent each DSM-5 BDD criteria (with the exception of criterion D), the BDDS-5 is expected to have good internal reliability.

It is hypothesized that omitting section S will not lead to a loss in possible or likely BDD cases because it can only be answered with 'true' if the individual is predominantly dissatisfied about their weight.

Because the questions in section A-D of the BDDS-5 are formulated to closely follow the DSM-5 criteria, it is hypothesized that section A-D will correlate strongly with instruments are known to measure BDD, and correlate weakly with instruments that measure different constructs. For this reason it is also expected that the amount of potential BDD cases based on the BDDS-5 will not differ from the amount of cases based on other instruments measuring BDD.

Considering that the questions in section S are directly taken from a diagnostic instrument for ED, which was found to be highly accurate in terms of its discriminant validity (Aardoom, Dingemans, Op't Landt et al., 2012), the validity of section S is also expected to be good. Similarly, the amount of ED cases is expected not to differ between section S and validated ED instruments.

## **Methods**

### ***Study design***

Since data are collected once, the study fulfils the criteria of a cross-sectional design.

### ***In/exclusion criteria***

Inclusion criteria are an age of 18 years or older and a signed informed consent form. The exclusion criteria are visual handicaps and the inability to read Dutch.

### ***Sample selection***

The most important aspect of the sample selection is that both individuals with BDD and without BDD are represented so that the psychometric properties of the BDDS-5 to be established properly. A community sample is thus not preferable but rather a large range in the amount of BDD symptomatology in the sample. Recruiting subjects in a multitude of settings (Utrecht University, social media, personal networks, support websites for BDD and ED) is expected to contribute to this. Subjects responding through support websites for BDD are expected to have a high amount of BDD symptoms, subjects recruited on support websites for ED and the university campus are expected to have medium scores due to the comorbidity between eating disorders (Dingemans et al., 2012) and BDD and the higher prevalence among students (Bohne, Wilhelm, Keuthen et al., 2002). Subjects recruited in the remaining settings are expected to have the lowest amount of symptoms.

### ***Sample size calculation***

Because no pre-set difference needs to be detected, a sample size calculation is not warranted. The sample needed for a validation study has been established as two to 20 subjects per item, and for an exploratory factor analysis between 100 and 200 subjects are necessary (Arafat, 2016). It is therefore concluded that the preferable sample size for the present study is approximately N=180.



## ***Instruments***

### *Body Dysmorphic Disorder Screener DSM-5 (BDDS-5)*

The first section (A-D) of the BDDS-5 consists of 12 dichotomous questions, referring to the DSM-5 criteria of BDD (see Appendix A). The total scores can range from zero to 12, with higher scores indicating more BDD symptoms. Subjects will be considered a possible or likely BDD case if they answer positively ('true') to all three questions for criterion A, to least one question of criterion B, at least one question of criterion C and 'not true' on question D. This reasoning follows the way that BDD is classified according the DSM-5. To establish with certainty that the answer to criterion D is correct, the BDDS-5 section S consists of five questions pertaining the last four weeks, aimed to exclude an ED. AN is excluded if BMI >18,5 (S1 and S2) and the answer to S3 is no or if BMI < 18.5 and the answer to S3 is no. BN and BED are excluded if the answer to S4 and S5 is no. In cases where subjects fulfill criteria A-C the answer to question D is 'true' but a likely eating disorder is excluded based on section S, the individual will screen positive as a possible or likely BDD case.

### *Yale Brown Obsessive Compulsive Scale for BDD self-rating version (Y-BOCS-BDD-sr)*

The Y-BOCS-BDD-sr is a 12-question self-rating scale for of assessing BDD severity (van Rood & Bouman, 2007). The questions are addressed using a Likert scale ranging from zero to four. A total score ranging from zero to 48 can be calculated, with higher scores representing more symptoms. The internal consistency of the Y-BOCS-BDD-sr is good and the convergent and divergent validity are satisfactory (van Rood, & Bouman, 2007). The Y-BOCS-BDD-sr will be used to establish the convergent validity of section A-D of the BDDS-5.

### *Body Image concern inventory (BICI)*

The BICI (Littleton, , Axsom & Pury, 2005.; Littleton & Breitkopf, 2008). is a 19-item self-report measure that assesses dysmorphic appearance concern. Items are scored on a Likert scale ranging from one to five and is scored by adding up all the items. Scores can range from 19 to 95, with higher scores representing more pathology. The BICI has been translated to Dutch (van Rood & de Beurs, 2005) and

reference cut-off values have been established as 45 for men and 57 for women. The internal consistency is excellent and the convergent and divergent validity is good (Schulte-van Maaren, Giltay, van Hemert et al., 2014). The BICI total score will be used to establish the convergent and concurrent validity of section A-D of the BDDS-5.

#### *Appearance Anxiety Inventory (AAI)*

The AAI is a 10 item self-report measure designed to assess cognitive processes and safety seeking behaviours. The AAI was translated into Dutch (see Appendix B) with permission of the author (D. Veale, 2013) and back translated blindly in order to ensure proper cultural adaption (Beaton, Bombardier, Guillemin & Ferraz, 2000). Each item is scored on a Likert scale ranging from zero to four. The total score is obtained by adding all the items. The minimum score is zero and the maximum score is 40, with higher scores reflecting greater frequency. The scale was found to have a good internal consistency and moderate convergent validity (Veale, Eshkevari, Kanakam et al., 2014) and will be used to establish the convergent validity of section A-D of the BDDS-5.

#### *Eating Disorder Examination Questionnaire (EDE-Q)*

The EDE-Q is a 22-item self-report questionnaire for the assessment of eating disorder pathology. Items are rated on a 7-point scale, with higher scores reflecting greater severity or frequency. A global score can be calculated by summing and averaging the individual items. Higher scores are indicative of higher pathology. For the present study, a clinical cut-off value of a global score of 2.17 will be used (Dingemans, van Son, Aardoom et al., 2016). The internal consistency of the EDE-Q was found to be excellent (Aardoom, Dingemans, Op't Landt & Van Furth, 2012). Several studies provide support for the validity of the scores on the EDE-Q for assessing eating disorder symptoms (Berg, Peterson, Frazier, & Crow, 2011). The EDE-Q will be used to establish the convergent and concurrent validity of section S of the BDDS-5.

### *Symptom Questionnaire-48 (SQ-48)*

The SQ-48 consists of 48 questions to assess severity of general psychopathology and does not include specific questions about appearance dissatisfaction or eating disorders. Items are rated on a 5-point scale, with higher scores reflecting greater frequency. In the current study a total score will be used, calculated by adding all the subscales excluding 'work' and 'vitality'. Total scores can have a minimum of 0 and a maximum of 148. The internal consistency was found to adequate to high. Measures of the convergent validity show correlation coefficients range from moderate to strong (Carlier, Schulte-Van Maaren, Wardenaar et al., 2012). The SQ-48 will be used to establish the divergent validity of section A-D and section S of the BDDS-5.

### ***Demographic variables***

Demographic variables regarding age, sex, marital status, living situation, education level, work, and country of residence will be measured in order establish representativeness of the sample.

### ***Data collection***

Data will be collected through an online survey program because of the known low costs, fast response and achievable population range (Ilieva, Baron & Healey, 2002). It also solves the issue of missing data, as questions are set to be mandatory. In order to ensure the maximum response rate, follow-up emails and an incentive in the form of a 5-euro voucher will be implemented, as they have been known to increase the response rate (Deutskens, De Ruyter, Wetzels & Oosterveld, 2004).

### ***Ethical considerations***

Data will be collected anonymously and will not be linked to birth dates or email addresses. Subjects will be informed about the study procedure, and that they can stop participating at any time during the study. Questions may be considered confrontational, which is why references will be made to resources such as BDD and eating disorder information websites ([proud2Bme.nl](http://proud2Bme.nl), [bbd-info.nl](http://bbd-info.nl)) and a suicide prevention foundation ([113.nl](http://113.nl)).

### ***Statistical analyses***

Data will be processed using SPSS version 25. Percentages and standard deviations will be calculated for the demographic variables.

A principal axis factor analysis using a direct oblimin rotation will be carried out on all 17 items of the BDDS-5 in order to determine the underlying factor structure. The KMO measure will be used to verify the sampling adequacy (Field, 2013).

Cronbach's alpha of the individual factors will be computed as a measure of the reliability. Chronbach's alpha must have a level of  $\geq .70$  for the instrument to have sufficient internal reliability (Field, 2013).

A significant chi square test ( $p < .05$ ) comparing the amount of likely BDD cases on the BDDS-5 with and without section S will prove whether section S can be omitted from the BDDS-5 without resulting in a loss of possible BDD cases. Phi will be used to assess the effect size. The significance will determine which subsequent analyses performed.

Computing the SS of the questionnaires and performing a Kolmogorov-Smirnov test will determine if the responses are normally distributed. A normal distribution is assumed if  $p > .05$ . Pearson correlations will be computed if the assumption of normality is met, and otherwise Spearman's rho will be used.

If there is significant ( $p < .05$ ) correlation of  $r \geq .50$  (Mukaka, 2012) between the SS of section A-D and the SS of the BICI, Y-BOCS-BDD-sr and AAI, then evidence of convergent validity is assumed. Divergent validity of section A-D will be assumed if the correlation between the SS of section A-D and the SS of the SQ-48 is not significant ( $p > .05$ ) and  $r \leq .30$  (Mukaka, 2012).

Concurrent validity of the BDDS-5 will be established by computing a chi square test with Phi as an effect size, comparing the number of possible or likely BDD cases with the number of likely BDD cases on the BICI with cut-off values 45 and 57 ( $p < 0.05$  for significance).

### ***Additional analyses if section S is to be included***

If section S cannot be omitted due to a loss of cases, the validity of this will be assessed.  $p < .05$  and a correlation of  $r \geq .50$  between section S of the BDDS-5 and the EDE-Q is seen as evidence for convergent validity of this section, and  $p > .05$

and a correlation of  $r \geq 0.5$  between section S and the SQ-48 will be seen as evident for the divergent validity.

Computing a chi square test ( $p < 0.05$ ) with Phi as a measure for effect size, comparing the number of possible or likely eating disorder cases based on section S of the BDDS-5 and the EDE-Q global score (cut-off 2.17), will determine the concurrent validity of section S.

## Results

The total sample size was  $N = 234$ , with  $N = 1$  excluded from the analysis due to faulty data entry. The ages in the sample were relatively diverse ( $M = 31.98$ ,  $SD = 13.24$ ). The majority consisted of females (78%) and the rest of males (22%). Most of the participants listed the Netherlands as their country of residence (76%). However, a substantial proportion resided in Belgium (24%) and a minority (1%) in other countries (UK and Turkey). The majority of the sample was unmarried (65%), lived independently (33%) had a university education level (39%) and were still studying (32%). However, all categories for marital status, living situation education level and work were represented.

The principal axis factor analysis showed  $KMO = .90$ , and all  $KMO$  values for the individual items well above the acceptable limit of .5 (Field, 2013). An initial analysis was run to obtain eigenvalues for each factor in the data. Four factors had eigenvalues greater than one and in combination explained 62.31% of the variance. The scree plot showed an inflexion that would justify retaining three factors. Table 1.1 shows the factor loadings after rotation. The items that cluster on the same factor suggest that factor one (A1 until C3) represents BDD symptoms, factor two (D, S3, S4 and S5) represents ED symptoms and factor three (S1 and S2) height and weight. An exception is found with item A3, which has a factor loading of .10 with factor one and negative factor loadings with the two other factors. The hypothesis of two factors is to be rejected.

*Table 1.1* Summary of the exploratory factor analysis results for the BDDS-5 (N = 234)

Item	Rotated factor loadings		
	Factor 1 (BDD symptoms)	Factor 2 (ED symptoms)	Factor 3 Height and weight
A1	<b>.79</b>	.04	-.02
A2	<b>.86</b>	-.01	.02
A3	.10	-.14	-.10
B1	<b>.73</b>	.27	-.11
B2	<b>.59</b>	.03	-.15
B3	<b>.65</b>	-.25	-.07
B4	<b>.57</b>	.21	-.21
C1	<b>.81</b>	.14	-.10
C2	<b>.79</b>	.03	.09
C3	<b>.81</b>	-.02	.23
C4	<b>.76</b>	-.11	.10
D	-.14	<b>.71</b>	-.08
S1	-.03	.17	<b>.81</b>
S2	.10	-.12	<b>.82</b>
S3	.37	<b>.57</b>	-.24
S4	.21	<b>.63</b>	.20
S5	.42	<b>.52</b>	-.12
Eigenvalues	6.55	1.54	1.44
% of variance	38.53	9.05	8.48
$\alpha$	.89	.63	.56

*Note:* Factor Loadings above .40 appear in bold.

As also seen in table 1.1 is that the Chronbach's alpha for factor one was .89, .63 for factor two and .56 for factor three. It can thus be concluded that factor one is the only reliable subscale, and that the hypothesis needs to be rejected for the remaining factors.

The results of the chi square test (table 1.2) showed a significant association between the percentage of possible or likely BDD cases on the BDDS-5 when section S was included and when section S was not included  $X^2 (1, N = 234) = 225.78, p < .001, \phi = .59$  indicating a large effect (Haddock, Rinkdskopf, & Shadish, 1998). Therefore the hypothesis can be accepted.

Table 1.2. Cross tabulation matrix of BDD cases based on the BDDS-5 with and without section S

			BDDS-5 section A-D		Total
			No BDD	BDD	
<b>BDDS-5 section A-D and section S</b>	No BDD	Count	201	0	201
		Expected count	173.5	27.5	201
	BDD	Count	1	32	33
		Expected count	28.5	4.5	33
<b>Total</b>	Count	202	32	234	
	Expected count	202	32	234	

The BDDS-5 section A-D had SS scores with  $M = 4.33$ ,  $SD = 3.46$ . The BDD-YBOCR-sr had SS scores with  $M = 17.88$ ,  $SD = 11.73$ . The BICI had a SS scores with  $M = 49.07$ ,  $SD = 17.84$ . The AAI SS scores with  $M = 13.07$ ,  $SD = 8.75$ . The EDE-Q had SS scores with  $M = 1.97$ ,  $SD = 1.75$ . The SQ-48 had SS scores with  $M = 40.21$ ,  $SD = 30.73$ .

Results of the Kolmogorov-Smirnov were significant for all SS scores showing  $D(234) = 0.19$  for the BDDS-5,  $D(234) = 0.11$  for the Y-BOCS-BDD-sr,  $D(234) = 0.09$  for the BICI,  $D(234) = 0.15$  for the AAI,  $D(234) = 0.15$  for the EDE-Q and  $D(234) = 0.14$  for the SQ-48 (all  $ps < .001$ ). None of the scores followed a normal distribution. All data was right skewed, showing more low to medium scores. Therefore Spearman's rho will be used as a correlation coefficient.

As seen in table 1.3, the SS of section A-D of the BDDS-5 was significantly correlated with the SS of the BICI with  $r_s = .89$ , the SS of the Y-BOCR-BDD-sr with  $r_s = .83$ , and the SS of the AAI with  $r_s = .86$ , (all  $ps < .001$ ). The correlations can be viewed as very strong (Mukaka, 2012). Evidence of convergent validity is assumed and the hypothesis can be accepted.



Table 1.3. Spearman's rho correlation matrix of the SS of BDDS-5 section A-D, Y-BOCS-BDD-sr, BICI, AAI and SQ-48

	<b>BDDS-5 section A-D</b>	<b>BICI</b>	<b>Y-BOCS- BDD-sr</b>	<b>AAI</b>	<b>SQ-48</b>
BDDS-5 section A-D	1	.89***	.83***	.86***	.72***
BICI		1	.85***	.93***	
Y-BOCS- BDD-sr			1	.82***	
AAI				1	
SQ-48					1

\*\*\*  $p < .001$ .

The SS of section A-D of the BDDS-5 was significantly and strongly (Mukaka, 2012) correlated with the SS of the SQ-48,  $r_s = .72$ ,  $p < .001$  (table 1.3). Evidence of divergent validity cannot be assumed and the hypothesis is to be rejected.

The results of the chi square test (table 1.4) showed a significant association between the percentage of possible or likely BDD cases on the BDDS-5 and the percentage of possible or likely BDD cases on the BICI  $\chi^2 (1, N = 234) = 61.10$ ,  $p < .001$ ,  $\phi = .51$  indicating a large effect (Haddock et al., 1998). Therefore the hypothesis can be accepted.

Table 1.4. Cross tabulation matrix of BDD cases based on the BDDS-5 section A-D and the BICI

		<b>BICI</b>		<b>Total</b>	
		No BDD	BDD		
<b>BDDS-5 section A- D</b>	No BDD	Count	150	52	202
		Expected count	130.4	71.6	202
	BDD	Count	1	31	32
		Expected count	20.6	11.4	32
<b>Total</b>		Count	151	83	234
		Expected count	151	83	234

## Discussion

In conclusion, the current study aimed to establish the psychometric properties of the BDDS-5, which to our knowledge is the first screener for BDD based on the DSM-5 criteria to be developed in the Netherlands. It was also investigated whether the form and length of the BDDS-5 could be improved by removing the additional ED section.

Results showed that the BDDS-5 including section S contained three factors representing BDD symptoms, eating ED symptoms and height and weight. Question A3 was found to be an exception, as it didn't seem to belong to any of the three factors. Furthermore, it was found that only the factor representing BDD symptoms was reliable.

It was possible to prove that section S could be omitted from the BDDS-5, without reducing the ability of the BDDS-5 to detect BDD cases.

It could be concluded that the convergent validity of section A-D was good. However, it was not possible to prove the divergent validity of section A-D, because strong correlations were also found with instruments for measured constructs other than BDD.

Comparing the amount of possible of likely BDD cases on the BDDS-5 with the BICI provided evidence the BDDS-5 was equally adequate at detecting individuals with BDD as the BICI.

There were a number of results that were unexpected. A third factor was found in the BDDS-5, which seemed to represent height and weight (BMI). Contrary to the expectations, this factor did not relate to the rest of the ED questions. However, this can be explained when looking at the algorithm that was used to establish ED pathology in section S where AN is excluded based on question S3 regardless of BMI. This is in accordance with research on this topic which shows there are discrepancies in the current weight cut-off's for AN, making it an unreliable measure (Thomas, Roberto & Brownell, 2009). If BMI is not taken into account, then the two factor hypothesis is indeed supported.

The fact that question A3 had low factor loadings could be caused by the different ways in which it can be interpreted. The question states: others think that there is nothing wrong with my appearance, or they think that I shouldn't worry about it. In the current formulation, it can be answered with 'true' in cases where

individuals are both satisfied or dissatisfied with their own appearance. This would result in an affirmative answer, regardless of whether someone shows other BDD pathology. For the factors representing eating disorders and height and weight, the reliability was substantially lower than the factor representing BDD. Even though the content of the questions could theoretically cause this, a logical explanation is fact that these factors had far less items which is known to decrease cronbach's alpha (Field, 2013).

Contrary to expectations, divergent validity could not be established using the criteria of  $r < .30$  and  $p > .05$ . It should however be noted that the correlation, even though still high, was found to lower than the correlation found for convergent validity. Furthermore, BDD is known to have high comorbidity with disorders such as depression and social phobia (Gunstad & Phillips, 2003), both of which are represented in subscales of the SQ-48.

The current research is strong in the sense that provides evidence that the BDDS-5 is a reliable instrument that seems to measure the same construct as other validated BDD instruments. Additionally, proving that section S can be removed without negative consequences will substantially increase the quality and usefulness of the screener.

However, the study needs to be viewed in light of some weaknesses. Establishment of BDD cases based on the BICI is not optimal as it is not considered a golden standard. Furthermore, the cut-off scores that were used were based on a Dutch sample whereas our sample included Belgian, UK and Turkish residents. This is a consequence of recruiting subjects online and only having 'Dutch speaking' as an inclusion criterion.

Another important point is that the formulation of criterion D in the current way not only excludes ED, but also the subtype of BDD that deals with muscle dysmorphia (American psychiatric Association, 2014) as this deals with patients who consider themselves too thin. It is therefore likely that possible cases have been missed.

Future research should aim to establish the divergent validity of the BDDS-5 using the individual subscales of the SQ-48. In that way it can be investigated if the correlation is lowest with the subscales that represent pathology that co-occur with BDD the least often (Denys & Vulink, 2011) such as the aggression subscale.

The next step would be to conduct a clinical interview alongside the BDDS-5 in order to establish the sensitivity and specificity of the BDDS-5. It is also important that the validation process is continued in samples under 18 years as this is needed to target the patient delay.

If the BDDS-5 is to be used in clinical practice, it is recommended only section A-D is used that the clinician takes into consideration that the divergent validity is yet to be established. Furthermore, both question A3 and D should be revised in terms of their formulation before application.

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# Appendix A

BDDS-5 versie 18+

## BDDS-5

De volgende vragen gaan over gedachten en gevoelens die mensen kunnen hebben over hoe ze er uit zien (uw uiterlijk). Lees de onderstaande uitspraken en geef per uitspraak aan of deze voor u waar is of niet. Als de uitspraak voor u waar is, zet u een kruisje bij "Waar". Als de uitspraak voor u niet waar is, zet u een kruisje bij "Niet waar".

	Waar	Niet waar
A1 Ik vind dat ik er raar of lelijk uit zie	<input type="checkbox"/>	<input type="checkbox"/>
A2 Ik moet er steeds aan denken dat ik er raar of lelijk uit zie	<input type="checkbox"/>	<input type="checkbox"/>
A3 Anderen vinden dat er niets mis is met mijn uiterlijk, of ze vinden dat ik me er niet druk over hoeft te maken.	<input type="checkbox"/>	<input type="checkbox"/>
B1 Ik kijk steeds weer in de spiegel omdat ik ontevreden ben over hoe ik er uit zie, of ik kijk juist niet in de spiegel omdat ik niet wil zien dat ik er raar of lelijk uit zie.	<input type="checkbox"/>	<input type="checkbox"/>
B2 Ik pulk steeds weer aan mijn huid, of ik verander dingen aan mijn kleren omdat ik ontevreden ben over hoe ik er uit zie.	<input type="checkbox"/>	<input type="checkbox"/>
B3 Ik vraag anderen steeds weer of ze vinden dat ik er raar of lelijk uit zie.	<input type="checkbox"/>	<input type="checkbox"/>
B4 Ik vergelijk mijn uiterlijk steeds weer met dat van anderen.	<input type="checkbox"/>	<input type="checkbox"/>
C1 Ik voel me naar of rot door hoe ik er uit zie.	<input type="checkbox"/>	<input type="checkbox"/>
C2 Ik doe sommige dingen niet (bijvoorbeeld uitgaan, daten, van baan veranderen, of op reis gaan) omdat ik ontevreden ben over mijn uiterlijk.	<input type="checkbox"/>	<input type="checkbox"/>
C3 Ik vind het moeilijk om dingen samen met anderen te doen omdat ik ontevreden ben over mijn uiterlijk .	<input type="checkbox"/>	<input type="checkbox"/>
C4 Ik heb moeite om mijn aandacht bij mijn werk of een gesprek te houden omdat ik ontevreden ben over mijn uiterlijk.	<input type="checkbox"/>	<input type="checkbox"/>
D De enige reden dat ik ontevreden ben over mijn uiterlijk is omdat ik mijzelf te dik (te zwaar) of te dun (te licht) vind.	<input type="checkbox"/>	<input type="checkbox"/>

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De volgende vragen gaan uitsluitend over de afgelopen 4 weken. Kruis het vakje aan dat op u van toepassing is.

- S1 Wat is uw gewicht op dit moment? kg
- S2 Hoe lang bent u? cm
- Ja Nee
- S3 Was u voortdurend erg bang om in gewicht toe te nemen (zwaarder te worden/ aan te komen)?
- S4 Heeft u extreem grote hoeveelheden voedsel gegeten en had u tijdens het eten het gevoel de controle over het eten kwijt te zijn?
- S5 Heeft u opzettelijk gebraakt, laxantia gebruikt of dwangmatig gesport om controle te krijgen over uw gewicht of uw figuur te veranderen?

DANK U WEL

## Appendix B

V 210519

### Appearance Anxiety Inventory

Zet een kruis in het hokje dat het beste beschrijft hoe je over je uiterlijk voelde tijdens de AFGELOPEN WEEK, MET VANDAAG ERBIJ.

		Nooit (0)	Soms (1)	Vaak (2)	Heel erg vaak (3)	Voortdurend (4)
1	Ik vergelijk aspecten van mijn uiterlijk met die van anderen.					
2	Ik controleer mijn uiterlijk (bijvoorbeeld door in spiegels te kijken, door het aan te raken met mijn vingers of door foto's van mijzelf te nemen).					
3	Ik vermijd situaties of mensen vanwege mijn uiterlijk.					
4	Ik blijf maar denken over gebeurtenissen in het verleden of aan verklaringen voor waarom ik er uit zie zoals ik er uit zie.					
5	Ik bedenk hoe ik aspecten van mijn uiterlijk kan camoufleren (verbergen) of veranderen.					
6	Ik ben gericht op hoe ik denk dat ik er uit zie in plaats van op mijn omgeving.					
7	Ik vermijd te kijken naar spiegelende oppervlakten, foto's of video's van mijzelf.					
8	Ik bespreek mijn uiterlijk met anderen of stel hen vragen er over.					
9	Ik probeer aspecten van mijn uiterlijk te camoufleren (verbergen) of te veranderen.					
10	Ik probeer te voorkomen dat mensen in een bepaalde situatie aspecten van mijn uiterlijk zien (bijvoorbeeld door een andere houding aan te nemen of fel licht te vermijden).					
	Subschaal vermijden					
	Subschaal dreiging monitoren					
	Totaal					

YR van Rood en N. van Wyk, 2019

Nederlandse vertaling van de Appearance Anxiety Inventory. (D. Veale, 2013)

Vertaald met toestemming van de auteur.