

**A Psychometric Validation of the Dysmorphic Concerns Questionnaire  
(DCQ) in Adolescents and Young Adults**

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*Acknowledgements:*

None.

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## Abstract

Body dysmorphic disorder (BDD) is a chronic mental health **condition** with symptoms typically emerging in early adolescence. Despite the onset in adolescence, most self-report BDD severity measures have not been validated within adolescent and young adult samples. The Dysmorphic Concerns Questionnaire (DCQ) was developed to assess dysmorphic concern and to date has only been psychometrically validated in adult samples. The aim of the current study was to examine the psychometric properties of the DCQ to ensure it is suitable for clinical use with **adolescent and young adult** patients. 195 **individuals** aged 12-21 years ( $M = 18.25$ ,  $SD = 2.51$ ; 59% female) participated in the study. The DCQ demonstrated a unidimensional construct [ $\chi^2(14) = 24.59$ ,  $p = .04$ ;  $RMSEA = .06$ ,  $SRMR = .02$  and  $CFI = .99$ ], with **good** internal consistency ( $\alpha = .88$ ). The DCQ also showed high convergent validity with measures of BDD symptomatology, however, divergent validity was not supported in this study. Known-groups validity of the DCQ was established, with a large effect size ( $d = 1.28$ ). These findings indicate that the DCQ is a brief, reliable, and valid measure that is appropriate to screen for symptoms of BDD in **adolescent and young adults** and to monitor symptom change during treatment.

*Keywords:* adolescents; body dysmorphic disorder; dysmorphic concern; body image; patient-rated outcome measures

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## **Key points**

### **What is already known about this topic**

1. Body dysmorphic disorder is a mental health condition which results in significant functional impairment.
2. The Dysmorphic Concerns Questionnaire (DCQ) is a psychometrically sound measure of dysmorphic concern.
3. Body dysmorphic disorder commonly occurs in adolescence

### **What this topic adds**

1. This is the first study to evaluate the psychometric properties of the DCQ in a sample of adolescents and young adults.
2. The psychometric properties of the DCQ are similar in adult and adolescent/young adult samples.
2. The DCQ is appropriate to use with adolescent and young adult patients.

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## **A Psychometric Validation of the Dysmorphic Concerns Questionnaire (DCQ) in Adolescents and Young Adults**

Body dysmorphic disorder (BDD) is characterized by extreme preoccupation with an imagined defect in appearance (American Psychiatric Association, 2013). The disorder generally results in severe distress (Phillips et al., 2006), with affected individuals experiencing elevated rates of suicidal ideation and suicide attempts (Albert et al., 2019). BDD symptoms typically develop in early adolescence, with the average age of onset being 16 years (Bjornsson et al., 2013). The disorder has a chronic course, with few individuals achieving remission without psychological and/or psychiatric treatment (Phillips et al., 2013).

BDD prevalence is estimated at 2% (Buhlmann et al., 2010; Koran et al., 2008), however, this is likely an under-estimate given BDD symptoms are not typically captured within large epidemiological studies of mental health prevalence. Individuals with BDD **often** consult plastic surgeons or dermatologists rather than mental health professionals; perceiving their suffering as physical imperfection rather than psychological distress (Kashan et al., 2021). Individuals with BDD are highly reticent to disclose their distress (Wilhelm et al., 2013) and **clinicians often do not recognize the symptoms of BDD or are unaware of how to screen for the disorder. Because of this, BDD is often misdiagnosed** as social anxiety, substance use disorder, or depression (Grant et al., 2001). Consequently, BDD is considered widely under-detected in clinical assessment, especially among adolescents and young adults (Buckley et al., 2018).

**While the prevalence rates and clinical features of BDD are similar across adult and adolescent and young adult samples (Phillips et al., 2006), young people with BDD often have lower levels of insight into their symptoms (Phillips et al., 2006; Rautio et al., 2022). BDD has a considerable impact on adolescents and young adult functioning and mental**

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health. For instance, many young people with BDD dropout of school as a result of their symptoms, and a significant proportion engage in self-harm behaviors and suicide attempts (Rautio et al., 2022). This highlights the importance of early detection and intervention for BDD symptoms in children, adolescents and young adults.

Mental health conditions are complex and require an evidence-based assessment to ensure accurate diagnosis, which subsequently informs an evidence-based treatment.

**Evidence-based assessment** is a clinical evaluation method integrating theory and research to develop the underlying disorder constructs (Hunsley & Mash, 2007). Subsequently, these constructs are tested among populations of interest to ensure the reliable and valid measurement of clinical information (Moses et al., 2020). In the absence of **evidence-based assessment**, individuals are vulnerable to receiving inferior or detrimental treatments (Jensen-Doss & Weisz, 2008). In BDD, an under-detected, concealed, and potentially fatal condition; the need for valid and reliable **evidence-based assessment** for **adolescent and young adults** is one of urgent priority.

One core component of **evidence-based assessment** is the use of self-report outcome measures. Despite the importance of valid and reliable self-report outcome measures, and BDD symptom onset being common during adolescence, the psychometric characteristics of many prevailing BDD screening tools and outcome measures have not been thoroughly investigated in **adolescent and young adult** samples. Historically, the most commonly used self-report outcome measures for the assessment of BDD symptoms included the BDD Questionnaire (Phillips et al., 1995); the Body Image Disturbance Questionnaire (Cash et al., 2004), the Dysmorphic Concerns Questionnaire (Oosthuizen et al., 1998), and the Appearance Anxiety Inventory (Veale et al., 2014). These self-report outcome measures were developed primarily for use in adults within clinical research settings (Roberts et al., 2019), thus the psychometric properties of these tools in **adolescent and young adult** samples is not

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well understood. These tools were also developed prior to the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; APA, 2013) and thus reflect outdated diagnostic criteria.

Since the release of the DSM-5, three self-report outcome measures have been developed for the assessment of BDD symptoms including the Body Dysmorphic Disorder-Dimensional scale (LeBeau et al., 2013), a 5-item scale which maps directly onto the DSM-5 BDD criteria; the BDD Symptom Scale (Wilhelm et al., 2016), a 54-item scale assessing BDD symptoms, which uses a symptom identification scale and a severity scale; and finally the Body Dysmorphic Disorder Scale for Youth (Hanley et al., 2020) a 20-item measure that also includes a screening tool and a severity scale to support treatment-planning-and-monitoring for individuals aged (12-25 years).

While the Body Dysmorphic Disorder-Dimensional scale, the BDD Symptom Scale, and the Body Dysmorphic Disorder Scale for Youth have unique strengths, they share several limitations. First, none have been comprehensively validated (e.g., using clinical samples, or with cultural, gender, or sexual minorities), there is limited consideration of the factor structure robustness of each scale, and no known studies have investigated whether measurement invariance, the psychometric equivalence of a construct, holds across adolescent/young adult and adult groups. Second, these measures lack cut-off scores, and receiver operating characteristic analyses to identify the specificity and sensitivity of the measures. Third, as these measures are based on DSM-5 criteria, they may be less appropriate for individuals who do not meet diagnostic threshold. Arguably, this may result in floor effects across the measures, whereby a large percentage of respondents score near the lower end, leading to difficulties in the identification of sub-clinical BDD cases. Finally, only the Body Dysmorphic Disorder Scale for Youth was developed with adolescent and young adults as the target demographic.

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One of the most widely used measures to assess the presence and severity of BDD symptoms is the Dysmorphic Concerns Questionnaire (Oosthuizen et al., 1998). The DCQ is a brief, 7-item measure consisting of items derived from the General Health Questionnaire (GHQ; Goldberg, 1972) with an administration time of 2-5 minutes (Jorgensen et al., 2001). The DCQ is based upon the construct of dysmorphic concerns that are considered central to BDD preoccupations. Dysmorphic concerns are hypothesized to span numerous diagnostic categories including anxiety, mood, and eating disorders (Johnson et al., 2019; Monzani et al., 2012), and are emphasized as a symptom, rather than a disorder, to acknowledge that appearance-based preoccupations can be transdiagnostic (Jorgensen et al., 2001) and/or present in individuals who do not yet meet full diagnostic criteria (Oosthuizen et al., 1998). Given BDD symptoms typically emerge during early adolescence, the ability to rapidly assess dysmorphic concerns is significant, as it may support earlier intervention to mollify disorder progression.

The psychometric properties of the DCQ have been extensively studied (Mancuso et al., 2010; Oosthuizen et al., 1998; Senín-Calderón et al., 2017; Stangier et al., 2003). The DCQ demonstrates good to excellent internal consistency of between  $\alpha = .88 - .93$  in adult samples (Kapsali et al., 2020; Schieber et al., 2018). The factor structure of the DCQ has been consistently demonstrated as unidimensional, within clinical (Jorgensen et al., 2001; Oosthuizen et al., 1998), non-clinical (Schieber et al., 2018), mixed (Kapsali et al., 2020; Mancuso et al., 2010) and specific sub-populations [e.g., twins (Monzani et al., 2012) and dermatological patients (Stangier et al., 2003)]. The DCQ has also been shown to be sensitive to treatment effects (Johnson et al., 2019). Notably, an investigation by Rozzell and colleagues (2020) of the DCQ measurement invariance across a non-clinical ( $n = 957$ ), ethnically and racially diverse, sexual minority population found the DCQ to be invariant across gender, race, and ethnicity. While further studies are needed, the utility of the DCQ

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among diverse populations is a promising finding. Overall, although the DCQ pre-dates the DSM-5, it is a reliable, valid, and widely used, brief self-report measure, designed to assess both cognitive and behavioral components of dysmorphic concerns, and is useful for busy clinicians working with individuals displaying symptoms of BDD.

Although the DCQ is well-validated and widely used, its psychometric properties are unknown in clinical or non-clinical **adolescent and young adult** samples. It is important for the DCQ to be evaluated in **adolescent and young adult** samples for numerous reasons. First, this would ensure that the language used in the measure is suitable for **younger people** and is reflective of the experiences of BDD symptoms in **adolescent and young adult** populations. Second, it is imperative that scale properties seen in adult samples (i.e., factor structure, internal consistency, and validity) are replicated in **adolescent and young adult** samples. Third, reliability of the measure has generally only reported using Cronbach's alpha ( $\alpha$ ). In consideration of the obsolescence of Cronbach's alpha (McNeish, 2018), alternative analyses consistent with modern scale assumptions are needed. Given the limitations of the existing literature, the aim of the current study was to examine the psychometric properties of the DCQ in an **adolescent and young adult** sample. The study was designed as exploratory with no *a-priori* hypotheses.

### **Method**

#### **Participants**

One hundred and ninety-five **adolescent and young adults** aged between 12 to 21 years ( $M=18.25$ ,  $SD = 2.51$ ; 59% female) completed the study. Participants were a subsample of individuals previously used to examine the psychometric properties of the **Body Dysmorphic Disorder Scale for Youth** (Hanley et al., 2020).

#### **Measures**



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**Dysmorphic Concerns Questionnaire (DCQ; Oosthuizen et al., 1998).** The DCQ is a self-report 7-item measure, designed to assess both cognitive and behavioral components of dysmorphic concerns (e.g., *“have you ever considered yourself misformed or misshapen in some way (e.g., nose/hair/skin/sexual organs/overall body build)”*). Respondents rate their concerns, compared to those of others on a 4-point scale from 0 (not at all) to 3 (much more than most). The total range of scores is between 0 and 21, with higher scores indicating greater dysmorphic concern. The DCQ has good reliability ( $\alpha = .88$ ) and convergent validity with other theoretically related measures ( $r = .55 - .73$ ) (Oosthuizen et al., 1998), and good to excellent internal consistency of between  $\alpha = .81 - .93$  (Kapsali et al., 2020; Schieber et al., 2018). The measure has a validated unidimensional factor structure (Oosthuizen et al., 1998; Senín-Calderón et al., 2017; Schieber et al., 2018) and is strongly correlated with measures of distress and impairment (Oosthuizen et al., 1998). The DCQ has a cut-off score of 9, which correctly classified 91.6% of a combined clinical and non-clinical sample with sensitivity of 96.4% and specificity of 90.6% (Mancuso et al., 2010).

**Appearance Anxiety Inventory (AAI; Veale et al., 2014).** The AAI is a self-report, 10-item measure used to assess BDD-related obsessive thoughts and repetitive behaviors, termed “appearance anxiety” (e.g., *“I think about how to camouflage or alter my appearance”*). The AAI is scored on a 5-point scale of symptom frequency, from 0 (never) to 4 (always or almost always). Total scores on the AAI range from 0-40, with higher scores reflecting greater symptom severity. The AAI has a validated two-factor structure consisting of avoidance and threat monitoring (Veale et al., 2014) and good to excellent internal consistency ( $\alpha = .86 - .93$ ) in previous studies (Mastro et al., 2016; Veale et al., 2014). In the current sample,  $\alpha = .93$ . To date, no cut-off score has been determined. However, Roberts and colleagues (2018) proposed a threshold of BDD risk by averaging Veale and colleagues (2014) median clinical BDD score (27) and Mastro and colleagues (2016) median

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appearance-concerned community score (13) to arrive at an estimated cut-off score of 20.

Although this estimate is not a clinical cut-off, it is included as a measure of proxy BDD to inform concurrent validity. The AAI was also included as a measure of convergent validity.

**The Body Dysmorphic Disorder Scale for Youth (BDDSY) (Screeners) (Hanley et al., 2020).** The BDDSY is a 20-item measure which includes a brief screening tool (BDDSY-Screener; 5 items), and a symptom severity scale (BDDSY-Severity; 15 items; e.g., *“I worry a lot about the way I look”*). While the BDDSY severity scale has demonstrated excellent internal-consistency (Cronbach’s  $\alpha = .93$ ), sound convergent-validity ( $r = .69 - .87$ ), and a unidimensional factor structure in previous studies (Hanley et al., 2020), only the BDDSY (Screeners) was used in the current study.

The BDDSY (Screeners) aims to determine if an individual is likely to be experiencing BDD symptoms, and was designed to rapidly inform clinicians toward the possible presence of BDD symptoms. The BDDSY (Screeners) assesses: (1) time spent worrying about appearance (*“how much time do you spend worrying about your appearance each day”*; 0 (never) to 4 (more than 8 hours); (2) areas of the body that are of concern to the participant (*“which areas of your body do you often worry about”*; participant selects from list of body areas that often concern individuals with BDD, such as nose, skin, teeth etc.); (3) presence of avoidance behaviors (*“Is there anything you avoid doing or don’t do because of your worries about your appearance”*; participants select from common avoidance behaviors); (4) distress caused by appearance concerns (*“how much do your worries about the way you look and the behaviors you do to improve your appearance upset you”*; 0 (not upset at all) – 4 (extremely upset); and (5) impairment in functioning (*“how much do your worries and behaviors causes problems in your”* ... [school; university or work life; social life; home life; and daily activities] 0 (never) – 4 (always (everyday))).

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The BDDSY (Screening) was used to determine the likelihood of the participant meeting BDD diagnostic criteria and to inform sample characteristics and concurrent validity. Consistent with the original study (Hanley et al., 2020), participants were deemed to likely meet BDD criteria if they: (1) spent at least 1 hour a day worrying about their appearance; (2) indicated they worry about at least one body part; (3) indicated at least one area of avoidance; (4) indicated that they were at least “upset” about their appearance and/or behaviors; and (5) they indicated a level of interference of at least “sometimes” for at least one area of functioning.

**General Self-Efficacy Scale (GSE; Schwarzer et al., 1995).** The GSE is a self-report, 10-item measure designed to assess general self-efficacy (e.g., “*I am confident that I could deal efficiently with unexpected events*”). Scores range from 1 (not true) to 4 (very true). Accordingly, total scores range from 10-40 with higher scores reflecting higher general self-efficacy. The GSE demonstrated good to excellent internal consistency ( $\alpha = .83 - .95$ ) in previous studies (Juárez & Contreras, 2008; Nilsson et al., 2015) and  $\alpha = .90$  in the current study. The GSE scale was included as a measure of divergent validity given its lack of association to appearance evaluation (Jafary et al., 2011) and the lack of a significant correlation between BDD symptoms and self-efficacy (Allen et al., 2020).

### Procedure

Participants aged 18-21 years were recruited via social media, community noticeboards, word-of-mouth, and first-year psychology students from a regional Australian university, who received course credit in exchange for participation. Adolescent participants (aged 12-17 years) were recruited from a private high school following parental consent. BDD symptoms were not required to participate in the study. Interested individuals outside the age range of interest or non-English speaking were excluded from participation.

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A battery of online questionnaires was completed by each participant via the Qualtrics platform. Adolescent participants returned parental consent forms prior to accessing to the study. Online assent was also obtained for adolescent participants. The survey took approximately 15 minutes to complete, and required participants to answer demographic questions (e.g., gender, age, ethnicity) prior to undertaking the study questionnaires. To mitigate against potential priming and order effects, questionnaire delivery was randomized and counterbalanced across participants.

The original study was approved by the University of New England Human Research Ethics Committee (HE18-011) and the Brisbane Catholic Education Research and Ethics Committee (Ref. 283). Use of the data collected by Hanley *et al.* (2020) was approved by the University of Technology Sydney Human Research Ethics Committee (2018002456-23).

### **Statistical Analyses**

Differences in age and gender in those with and without likely BDD were examined. As BDD likelihood group sizes were unequal, the sample violated assumptions of both normality and homogeneity-of-variance. Accordingly, the non-parametric equivalent of the independent samples *t*-test, the Mann-Whitney *U*-test, was used to examine the differences in age based on the likelihood of meeting criteria for BDD. A chi-squared test for goodness-of-fit was used to assess whether there were any statistically significant differences in the likelihood of a BDD diagnosis based on gender.

Factor structure of the DCQ was examined using a confirmatory factor analysis (CFA) with weighted least squares means and variance adjusted (WLSMV) estimation. The model was considered a good fit if: (1) the Standardized Root Mean Square Residual (SRMR) was below .08 (Hu & Bentler, 1999); (2) the Root Mean Square Error of Approximation (RMSEA) was below .08 (MacCallum *et al.*, 1996); and (3) the Comparative Fit Index (CFI) was greater than or equal to .95 (Hu & Bentler, 1999).

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The validity of the DCQ was investigated using Spearman's rho bivariate correlation analyses with other BDD measures (AAI) for convergent validity, and with scales of conceptually dissimilar constructs (GSE) for divergent validity. The strength of associations was interpreted using Cohen's (1988) convention for correlation coefficient effect sizes in which .10, .30, and .50 are considered small, medium, and large, respectively. Known-group validity of the DCQ was assessed by comparing scores of those who likely met BDD criteria (based on a positive screen on the BDDSY (Screener) and AAI) with those unlikely to meet criteria using an independent samples *t*-test. Cohen's *d* was used to measure effect sizes; and were interpreted according to Cohen's (1992) convention of .20, .50, and .80, which correspond to small, medium, and large effect sizes, respectively.

Consistent with McNeish's recommendation (2018), internal consistency of the DCQ was assessed using three indices: Cronbach's  $\alpha$  (Cronbach, 1951); Coefficient *H* (Hancock & Mueller, 2001) and McDonald's Omega ( $\omega$ ; McDonald, 1999).

All data were analyzed using SPSS Version 28 and MPlus Version 8.3.

### Results

#### Sample characteristics

The demographic characteristics of the sample are outlined in Table 1. The mean age of participants was 18.25 years ( $SD = 2.51$ ) and 59% identified as female. The chi-squared test for goodness of fit determined that there were significant differences between gender and the likelihood of BDD ( $\chi^2(2, N=195) = 12.92, p < .01$ ) with 30.43% of females and 11.39% of males identified as likely meeting BDD criteria. Additionally, the only non-binary participant was identified as having a likely BDD diagnosis. A Mann-Whitney *U* test indicated that the mean age of participants with a likely BDD diagnosis ( $M = 18.96$  years,  $SD = 1.97$ , Mean Rank = 113.23,  $n = 45$ ) was significantly higher than those unlikely to have a BDD diagnosis

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( $M = 18.03$  years,  $SD = 2.62$ ,  $Mean Rank = 93.43$ ,  $n=150$ ) ( $U=2689.50$ ,  $z = -2.10$  (corrected for ties),  $p = .04$ ), two tailed, small effect size ( $r = -.15$ ).

### **Factor structure**

A CFA indicated that a single-factor model provided an acceptable fit to the data:  $\chi^2(14) = 24.59$ ,  $p = .04$ ,  $RMSEA = .06$ ,  $SRMR = .02$ , and  $CFI = .99$ . Table 2 provides a summary of correlations between DCQ items. Table 3 provides the means, standard deviations, and factor loadings for each DCQ item.

### **Reliability**

Internal consistency for the DCQ indicated good to excellent reliability, assessed using three indices: Cronbach's  $\alpha = .88$ , Coefficient  $H = .93$ , and McDonald's  $\omega = .92$ .

### **Convergent and divergent validity**

Table 4 provides a summary of correlations between the DCQ and measures of convergent and divergent validity. The DCQ was significantly correlated with the AAI ( $r = .75$ ,  $p < .01$ ; large effect size). Divergent validity was tested using bivariate correlations with the GSE. Significant negative correlations were found between the DCQ and GSE ( $r = -.39$ ,  $p < .01$ ), with a medium effect size.

### **Known-groups validity**

Those who likely met BDD criteria ( $n = 45$ ) using the BDDSY (Screening) endorsed significantly higher scores on the DCQ ( $M = 11.80$ ;  $SD = 4.25$ ) than those who were unlikely to meet BDD criteria ( $n = 150$ ;  $M = 5.98$ ;  $SD = 4.65$ ),  $t(193) = 7.51$ ,  $p < .01$ , two-tailed, with large effect size ( $d = 1.28$ ). Similarly, those considered at high risk of BDD ( $n = 67$ ), using Roberts and colleagues (2018) estimated AAI cut-off score of 20, endorsed higher scores on the DCQ ( $M = 11.64$ ;  $SD = 4.45$ ) than those not considered at risk of a BDD diagnosis ( $n = 128$ ;  $M = 5.06$ ;  $SD = 3.94$ ),  $t(193) = 10.58$ ,  $p < .01$ , two-tailed, with large effect size ( $d = 1.60$ ).

## Discussion

While the clinical features of BDD are thought to be similar across adolescents and adults (Enander et al., 2018), adolescents with BDD often have more frequent and severe delusional beliefs, and significantly greater functional impairment than their adult counterparts (Phillips et al., 2006). It is critical that self-report outcome measures designed for the detection and assessment of BDD symptoms are reliable and valid for this age group. The DCQ is a commonly used self-report outcome measure to assess BDD symptom severity, however, the psychometric properties of this assessment tool have not been evaluated to date in an **adolescent and young adult** sample. Therefore, the aim of the current study was to extend the literature by examining the psychometric properties of the DCQ in an **adolescent and young adult** sample. The study was designed as exploratory with no a priori hypotheses.

The findings of the current study confirmed that a single-factor model represented a good fit to the data. This is consistent with the model reported by Oosthuizen and colleagues (1998). Factor loadings **were** also consistent with previous research (Schieber et al., 2018; Senín-Calderón et al., 2017). While this outcome indicates that the single-factor structure of the DCQ reported among adults holds across **adolescent and young adults**; this community-based sample is likely to differ from a clinical sample consisting of individuals diagnosed with BDD. Therefore, an examination of the factor structure of the DCQ in clinical **adolescent and young adult** populations is a future research priority.

Consistent with Oosthuizen and colleagues (1998), results from the present study indicate that the DCQ displays good to excellent internal consistency across three indices of reliability. Two of these indices, Coefficient  $H$  and  $\omega$ , are considered to be more compatible with current statistical methods for constructing self-report outcome measures (McNeish, 2018). The coherence between these indices and Cronbach's  $\alpha$  provides preliminary evidence supporting the internal consistency of the DCQ in **adolescent and young adults** using

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contemporary analyses. Therefore, the DCQ appears to have good to excellent internal consistency in **adolescent and young adult** samples.

Evidence for the convergent validity of the DCQ was supported in the present study. The DCQ demonstrated a strong significant correlation with the AAI, a finding consistent with Oosthuizen and colleagues' (1998) report of strong correlations between the DCQ and measures of appearance-related distress and impairment. While these results are promising, future research could investigate the convergent validity of the DCQ in a clinical **adolescent and young adult** sample. Evidence for the divergent validity of the DCQ was not supported in the present study, however as it was significantly negatively correlated with a measure of self-efficacy (GSE; Schwarzer et al., 1995). While research investigating the relationship between BDD and self-efficacy is scarce, in a controlled clinical trial exploring self-efficacy and motivation toward plastic surgery (**which is a commonly sought treatment for individuals with BDD; Kashan et al., 2021**), Yin and colleagues (2016) reported that self-efficacy (measured using the GSE) mediated appearance-based evaluations. While this is not to suggest that participants who endorsed greater appearance-based concerns met criteria for BDD; it raises the possibility of a negative relationship between BDD and self-efficacy, which with further exploration could explain the negative correlation found in the present study between the DCQ and the GSE.

The known-groups validity of the DCQ was examined via comparison of scores between those who likely met criteria for a BDD diagnosis with those who were unlikely to meet BDD criteria. Participants who were likely to meet criteria for BDD scored significantly higher on the DCQ than those unlikely to meet diagnostic criteria on the BDDSY (Screener) (Hanley et al., 2020) and the estimated cut-off score of BDD risk on the AAI (Veale et al., 2014), with large effect sizes. This finding offers evidence in support of the accurate discrimination of likely from unlikely BDD cases using the DCQ in **adolescent and young**



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**adult** patients. Future research may wish to examine known-groups validity using patients who had been diagnosed with BDD using a diagnostic interview, rather than self-report measure, and may also wish to explore appropriate cut-off score for **adolescent and young adult** samples on the DCQ.

The current study has a number of notable strengths. First, this study is the first to investigate the psychometric properties of the DCQ in an **adolescent and young adult** sample, using an age-range based upon epidemiological definitions and contemporary reliability metrics. Second, the sample size exceeded “very good” classification by the consensus-based standards for the selection of health measurement instruments (COSMIN) for factor analysis, whereby  $n \geq 100$  and seven times the number of items (Mokkink et al., 2018). Third, the original validation of the DCQ (Oosthuizen et al., 1998) was also conducted in Australia, thus the replication of these findings in another Australian sample provide support for the cultural equivalence of the findings.

A number of limitations to the study should also be acknowledged. First, the present study consisted of non-clinical participants. Future investigation of the DCQ in **adolescent and young adults** should be directed toward evaluating the psychometric properties of the measure using clinical samples. Second, generalizability of the findings is limited by the higher proportion of young adults (75.90%) versus adolescents (24.10%). Insufficient adolescent participants also meant that factor structure invariance across **adolescent and young adults** could not be determined. Therefore, future research should involve a larger adolescent cohort to ensure the DCQ is appropriate for younger respondents, and to examine measurement invariance. Third, the adolescent sample consisted entirely of students from the same high school, **and thus these students may not be representative of adolescent and young adult samples more generally**. Although university students were also included in the sample, data regarding recruitment source or student status were not recorded. Therefore, the total

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number of university students in the sample, including those recruited from sources other than the first-year psychology pool, is unknown and thus the exact composition of the sample as well as the representativeness of the sample is unknown. Future studies may wish to collect recruitment data and expand their recruitment strategy to ensure that results are generalizable to adolescent and young adult populations. Finally, the present study included a singular non-binary participant, identified as likely meeting BDD criteria. While the DCQ is reportedly invariant across gender in sexual minority adults (Rozzell et al., 2020), gender in Rozzell and colleagues' (2020) study was considered male or female only. Thus, it is unknown at this stage if the DCQ is suitable for non-binary adolescent and young adult patients. As research specific to BDD in non-binary individuals is scarce (Galupo et al., 2021), this finding requires exploration not only with regard to the DCQ, but also in BDD generally.

The present study builds upon the limited available literature examining the psychometric properties of the DCQ in adolescent and young adult samples. Findings suggest that the DCQ is an appropriate self-report outcome measure for the assessment of BDD symptoms in this population. The use of valid, reliable, and age-appropriate measures, such as the DCQ, is crucial given the range of adverse experiences for adolescent and young adults with BDD, and the importance of capturing this information in various health settings (e.g., primary-care, psychological, psychiatric, and cosmetic) to enable earlier intervention which may limit disorder progression. The DCQ is a brief, well-validated, and easy to administer measure; essential properties for busy clinicians in the assessment of BDD, a highly concealed disorder. To further extend the research efforts should be made towards replicating these findings in clinical adolescent and young adult samples with adequate adolescent and non-binary representation.

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**Data Availability Statement:** The data that support the findings of this study are available from the corresponding author, [REMOVED FOR PEER REVIEW], upon reasonable request.

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