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Body dissatisfaction frequency and duration: Dissociable dimensions of trait body dissatisfaction

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ABSTRACT

This work proposes that trait body dissatisfaction rests on two dissociable components: 1) frequency of body dissatisfaction episodes, and 2) duration of such episodes, with higher trait body dissatisfaction resulting from more frequent and/or prolonged episodes. The current research aimed to develop a measure of these two dimensions (i.e., the Body Dissatisfaction Frequency Duration Questionnaire; BDFDQ) and test this theoretical model by investigating whether body dissatisfaction frequency and duration 1) were structurally dissociable, 2) meaningfully dissociable, and 3) each associated with different aspects of disordered eating behavior. Study 1 (N = 300, 42% women) developed the BDFDQ and showed that frequency and duration are structurally dissociable. Study 2 (N = 400, 50% women) showed that the two-factor model was invariant across gender and both subscales showed good psychometric properties of reliability and validity. Results further supported that frequency and duration are meaningfully dissociable by revealing that each component accounted for unique variance in trait body dissatisfaction. Study 3 (N = 279, 77% women) replicated Study 2 findings and established that frequency and duration subscales each associated with different aspects of disordered eating behavior. Together, findings imply that body dissatisfaction frequency and duration represent two separable dimensions underlying trait body dissatisfaction.

1. Introduction

Dissatisfaction with one's appearance (hereafter referred to as body dissatisfaction) is highly prevalent among Western populations (Fiske, Fallon, Blissmer, & Redding, 2014; Mond et al., 2013). The high prevalence of body dissatisfaction is of particular concern given that it is known to precede the emergence of eating disorders (Stice & Van Ryzin, 2019; Stice, Gau, Rohde, & Shaw, 2017; Stice, Marti, & Durant, 2011) and prospectively predict increased depressive symptoms and risky health behaviors including smoking, drug use, self-harm, and high-risk drinking (Bornioli, Lewis-Smith, Smith, Slater, & Bray, 2019; Sharpe et al., 2018). Despite evidence of the maladaptive consequences associated with body dissatisfaction, little is understood concerning the underlying latent structure of the body dissatisfaction construct. Thus, the overarching goal of the present research is to illuminate the dimensions underlying trait body dissatisfaction.

Trait body dissatisfaction has conventionally been viewed as a unitary construct reflecting individual differences in the degree to which people are likely to experience state episodes of dissatisfaction with their *shape and/or weight*. This construct is typically assessed using self-report measures requiring respondents to specify

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the extent to which they *generally* experience episodes of body dissatisfaction. However, such measures of 'general' trait body dissatisfaction might be insensitive to important differences in dispositional responding. For example, within the emotion field there are extensive literatures reporting that there at least two different types of dispositional responding that contribute to variability in 'general' trait affect scores (Becerra, Preece, Campitelli, & Scott-Pillow, 2019; Boyes, Carmody, Clarke, & Hasking, 2017; Boyes, Clarke, & Hasking, 2020; Rudaizky, Page, & MacLeod, 2012). Specifically, it has been shown that the disposition reflecting increased frequency with which an individual experiences an emotional reaction, and the disposition reflecting the experience of especially prolonged emotional reactions, each account for unique variance in trait anxiety scores (Rudaizky et al., 2012) and trait affect scores (Boyes et al., 2017). This evidence suggests that frequency and duration represent dissociable dimensions of trait anxiety and trait affect, and it is therefore plausible to assume that frequency and duration might also represent dissociable dimensions of trait body dissatisfaction.

We propose that trait body dissatisfaction rests on two dissociable components: 1) the *frequency* of body dissatisfaction episodes, and 2) the *duration* of such episodes. Either of these dispositions (*body dissatisfaction frequency* and *body dissatisfaction duration*) would increase the amount of time spent experiencing body dissatisfaction and, therefore, would be associated with higher trait body dissatisfaction scores. In turn, this raises the intriguing possibility that people with elevated trait body dissatisfaction might have different presentations. For example, some people might be characterized by the tendency to experience frequent (but not prolonged) episodes of body dissatisfaction, whereas other people might be characterized by the tendency to experience especially prolonged (but not frequent) episodes of body dissatisfaction. Moreover, both high frequency and duration might coexist, potentially representing the most harmful combination.

From a measurement perspective, should individuals be reporting (via questionnaire measures) the tendency to experience frequent and/or prolonged episodes of body dissatisfaction, then it should also be possible to detect these frequent and/or prolonged body dissatisfaction episodes as they occur in daily life using ecological momentary assessment (EMA). Specifically, EMA approaches incorporate event-based components (e.g., requiring participants to report body dissatisfaction episodes upon each occurrence) and time-based components (e.g., prompting participants to report on the duration of a body dissatisfaction episode) in the assessment of target behaviors and/or experiences in vivo over extended time periods (e.g., one week).

Should frequency and duration represent dissociable dimensions of trait body dissatisfaction, it would then become reasonable to assume that each dimension would associate with different disordered eating outcomes. Such a finding would parallel the demonstration that trait emotional frequency and duration are each associated with different theoretically-relevant constructs (Becerra et al., 2019; Boyes et al., 2017; Ripper, Boyes, Clarke, & Hasking, 2018). From a theoretical perspective, integrating the potential differential roles of trait body dissatisfaction frequency and duration could enrich models of the development and maintenance of body image and eating concerns, including prominent sociocultural models (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) and cognitive-behavioral accounts (Williamson, White, York-Crowe, & Stewart, 2004). Moreover, from an applied perspective, the potential differential roles of these two dimensions could support targeting different processes in prevention and intervention. Established models of emotion regulation, for example, highlight how frequency-based problems may require different emotion regulation approaches (e.g., situation selection and situation modification approaches to emotion regulation; Gross, 2015) compared to duration-based problems. Therefore, there would be value in considering the differing consequences of body dissatisfaction frequency and duration dimensions, in terms of the impact they exert on disordered eating outcomes.

1.1. The present study

To date, there are no questionnaire measures that can differentiate between the frequency and duration with which people experience episodes of body dissatisfaction. Consequently, the present research aimed to address that gap by developing and validating a new measure called the *Body Dissatisfaction Frequency and Duration Questionnaire* (BDFDQ). Specifically, this measure was designed to capture frequency and duration of *general* body dissatisfaction.

The overarching goal of the present research was to utilize this new measure to determine whether frequency and duration represent dissociable dimensions of trait body dissatisfaction. Specifically, across a series of three studies, the current research sought to achieve the following objectives: 1) determine whether body dissatisfaction frequency and duration can be structurally distinguished by establishing the factor structure of the novel measure (Studies 1–3), 2) determine whether it is meaningful to distinguish between body dissatisfaction frequency and duration by establishing whether each component accounts for unique variance in trait body dissatisfaction (Studies 2–3), 3) determine whether there will be clinical relevance in distinguishing between body dissatisfaction frequency and duration by establishing whether each component associates with different disordered eating behaviors (Study 3).

2. Study 1

The aim of Study 1 was to determine whether body dissatisfaction frequency and duration dimensions are structurally dissociable. This required the development of a measure that could distinguish between frequency and duration of body dissatisfaction episodes. In this study, we developed an initial version of the BDFDQ and examined its factor structure and internal consistency reliability in a general community sample. In an effort to develop a measure of *general* body dissatisfaction, this initial version of the BDFDQ was designed to capture the full range of body concerns, i.e., regarding one's body shape, weight, and muscularity.

2.1. Study 1 method

2.1.1. Participants

A total of 300 adults (172 men, 126 women, and 2 preferred not to say) were recruited via CloudResearch, an online crowd-sourcing research platform. The "CloudResearch Approved Participants" function was used to ensure recruitment of participants who had passed CloudResearch's attention and engagement measures. Participants were aged between 20 and 73 (M = 41.46, SD = 11.34) and were based in the United States (US) at the time of the study. The distribution of educational attainment within the sample was as follows: most of the sample (52.3%) had earned a bachelor's degree, 16.3% had earned an advanced diploma or diploma, 14% had earned a postgraduate degree, 12% had completed secondary school, 3% had completed trade school, 1.7% had completed some secondary school, and 0.7% preferred not to say. Majority of participants self-identified as Caucasian (76%), and the remainder of the sample identified as African American (11.3%), Asian (6.7%), or other (6%). The mean body mass index (BMI = kg/m^2) was 27.60 (SD = 7.21), ranging from 12.91 to 71.20.[1] Approximately 5% of the sample reported having had a

[1] Age data were missing for 13 participants and BMI data were missing for 15 participants.

Table 1
List of ten most prominent negative emotions and corresponding wording variations (Study 1).

Primary Negative Emotion	Wording Variant 2	Wording Variant 3
Dissatisfied	Unhappy	Disappointed
Anxious	Apprehensive	Nervous
Guilty	Ashamed	Regretful
Fearful	Afraid	Scared
Embarrassed	Self-conscious	Mortified
Envious	Jealous	Resentful
Disgusted	Revolted	Repulsed
Frustrated	Irritated	Annoyed
Distressed	Worried	Stressed
Insecure	Uncomfortable	Tense

formal eating disorder diagnosis. All participants were financially reimbursed for completing the online survey.

2.1.2. Procedures and measures

Ethical approval was obtained from the University of Western Australia's Human Research Ethics Committee. The online survey commenced by obtaining participants' informed consent followed by demographic items. BMI was computed from self-reported height and weight. Finally, participants completed the novel measure as described below.

2.1.2.1. Body Dissatisfaction Frequency and Duration Questionnaire. The BDFDQ was developed by the authors for the present study. A highly structured approach was used to generate a pool of 30 unique items that evenly represented shape concerns (10 items), weight concerns (10 items), and muscularity concerns (10 items). The process involved generating 10 prominent negative emotions, with three wording variations for each emotion (e.g., dissatisfied, unhappy, and disappointed), and systematically assigning a variant of each negative emotion to each of the three types of body-related thoughts (see Table 1 for the complete set of emotions). Each item used the following semantic structure: "*I feel* [emotion] *while thinking…*" yielding items such as "I feel dissatisfied while thinking about my shape", "I feel unhappy while thinking about my weight", and "I feel disappointed while thinking about my muscle tone". An expert panel, consisting of 13 researchers and clinicians in the body image and eating disorders field, was consulted about the appropriateness of the items generated and item content was reviewed to ensure comprehension and content validity. Participants were provided with the following directions as the standardized instructions for the BDFDQ:

> Many people commonly experience episodes of body dissatisfaction. Such episodes can be defined as the experience of a negative feeling accompanying thoughts about one's body shape, weight, or muscularity. Below you will find a list of specific examples of such episodes. Please answer the following two questions concerning the frequency with which you experience such episodes and how long they tend to last.

Participants were asked to provide two responses for each item. To assess frequency, participants were asked "What is the frequency with which you are likely to experience this particular episode?" (*1 = extremely infrequently; 6 = extremely frequently*). To assess duration, participants were asked "If you were to experience this particular episode, how long do you think this episode would likely last?" (*1 = extremely brief time; 6 = extremely long time*).

2.1.3. Analytic strategy

2.1.3.1. Factor structure. Using the lavaan package in R software, a series of models of increasing complexity were examined using confirmatory factor analysis (CFA) (maximum likelihood estimation with the Satorra-Bentler scaled χ^2 statistic and robust standard errors). These models were informed by theory and prior evidence. For instance, a unidimensional model was tested as the baseline model where trait body dissatisfaction is represented as a single construct, in accordance with traditional conceptualizations and measurements of body dissatisfaction (e.g., Body Shape Questionnaire; Cooper, Taylor, Cooper, & Fairbum, 1987). In support of making a distinction between shape/weight and muscularity items, increasing evidence indicates that dissatisfaction with one's muscularity is a distinct form of body dissatisfaction (Karazsia, Murnen, & Tylka, 2017; Ralph-Nearman & Filik, 2018, 2020).[2] An additional distinction between frequency and duration of body dissatisfaction episodes may be required given evidence for the separability of these components in other domains (Becerra et al., 2019; Boyes et al., 2017, 2020; Ripper et al., 2018; Rudaizky et al., 2012). It is also worth noting that CFA (rather than exploratory factor analysis) is better suited for establishing whether highly correlated constructs, such as frequency and duration, are separable. That is, it was anticipated that frequency and duration components would be highly correlated given that item phrasing was identical for frequency and duration versions of each item. Of course, variations of these models are also plausible (e.g., which make the distinction between frequency and duration for *shape/weight* items only). Detailed descriptions of each model will be described in turn.

Model 1 was a one-factor model in which all 60 items (30 frequency items and 30 duration items) were specified to load on to a single "Body Dissatisfaction" factor. Model 2 was a two-factor correlated model in which items were specified to load on to separate "Body Dissatisfaction Frequency" and "Body Dissatisfaction Duration" factors. Model 3 was a two-factor correlated model in which items were specified to load on to separate "Shape/Weight Concerns" and "Muscularity Concerns" factors. Model 4 was a two-factor correlated model in which *shape/weight* items were specified to load on to separate "Shape/Weight Concerns Frequency" and "Shape/Weight Concerns Duration" factors. Model 5 was a two-factor correlated model in which *muscularity* items were specified to load on to separate "Muscularity Concerns Frequency" and "Muscularity Concerns Duration" factors. Finally, Model 6 was a four-factor correlated model in which items were specified to load on to separate "Shape/Weight Concerns Frequency", "Muscularity Concerns Frequency", "Shape/Weight Concerns Duration", and "Muscularity Concerns Duration" factors. In addition, for the best-fitting model, we examined a version of this model which included correlated error terms between frequency and duration versions of each item (i.e., to account for method effects due to the fact that item phrasing was identical for frequency and duration version of each item).

The goodness-of-fit of these models was judged on the basis of factor loadings and factor intercorrelations within each model, as well as the following three fit indices: the comparative fit index (CFI), Tucker Lewis index (TLI), and root mean square error of approximation (RMSEA). CFI and TLI values ≥ 0.90 were judged to indicate acceptable fit and values ≥ 0.95 excellent fit. RMSEA values ≤ 0.08 were judged to indicate acceptable fit and values ≤ 0.06 excellent fit (Marsh, Hau, & Wen, 2004; Shi, Lee, & Maydeu-Olivares, 2019). To directly compare the fit of the models, the Akaike Information Criterion (AIC) and SBχ^2 difference test were also used. AIC penalises model complexity and lower values indicate better fit (Byrne, 2013).

2.1.3.2. Internal consistency reliability. Cronbach's alpha (α) and McDonald's omega (ω) reliability coefficients were calculated for

[2] The distinction between shape/weight concerns and muscularity concerns was further supported by results from an exploratory factor analysis. Results from this analysis are provided in Appendix A.

Table 2
Goodness-of-fit index values for the examined confirmatory factor analysis models of the 60-item BDFDQ in Study 1.

Model	SBχ2 (df)	CFI	TLI	RMSEA (90 % CI)	AIC
1	7814.745 (1710)	.664	.652	.109 (0.107-0.111)	50652.069
2	7560.534 (1709)	.678	.666	.107 (0.105-0.109)	49588.623
3	6110.802 (1709)	.758	.749	.093 (0.091-0.095)	48382.587
4	3341.134 (739)	.811	.800	.108 (0.105-0.111)	31948.440
4b	1498.301 (719)	.943	.939	.060 (0.057-0.063)	28958.625
5	1218.637 (169)	.723	.689	.144 (0.138-0.150)	15528.134
6	5820.182 (1704)	.773	.765	.090 (0.088-0.092)	47007.625

Note. Model 1 = unidimensional model, Model 2 = two-factor (frequency and duration) correlated model, Model 3 = two-factor (shape/weight concerns and muscularity concerns) correlated model, Model 4 = two-factor (frequency of shape/weight concerns and duration of shape/weight concerns) correlated model, Model 4b = two-factor (frequency of shape/weight concerns and duration of shape/weight concerns) correlated model + 20 correlated error terms, Model 5 = two-factor (frequency of muscularity concerns and duration of muscularity concerns) correlated model, Model 6 = four-factor (frequency of shape/weight concerns, frequency of muscularity concerns, duration of shape/weight concerns, and duration of muscularity concerns). For all examined models in Study 1, SBχ2 $p < .05$. CFI = comparative fit index, TLI = Tucker Lewis index, RMSEA = root mean square error of approximation, AIC = Akaike information criterion, CI = confidence interval.

each of the subscale scores. Reliability coefficients of .90 or higher were considered excellent (Groth-Marnat, 2009).

2.2. Study 1 results

2.2.1. Factor structure

CFAs revealed that a two-factor correlated model in which *shape/weight* items were specified to load on to separate "Shape/Weight Concerns Frequency" and "Shape/Weight Concerns Duration" factors, and which also included 20 correlated error terms between frequency and duration versions of each item, was the best solution. Goodness-of-fit index values and factor loadings are displayed in Tables 2 and 3, respectively.

The one-factor model (Model 1) was the worst solution and a poor fit to the data, highlighting that the BDFDQ was measuring a multidimensional construct. Neither Model 2 nor Model 3 improved levels of fit, indicating that it was insufficient to simply make a distinction between frequency and duration questions (Model 2) or between shape/weight and muscularity concerns (without considering frequency and duration; Model 3). Thus, statistically, it was necessary to make both these distinctions within the same model to maximise fit (i.e., Models 4, 5, and 6). Given the superior fit indices of Model 4, a version of Model 4 which included 20 correlated error terms between frequency and duration versions of each item (termed Model 4b) was examined. Model 4b was an excellent fit to the data according to all examined fit indexes; all items loaded strongly on their intended factor (factor loadings > 0.60), and the two factors (body dissatisfaction frequency and duration) were significantly positively correlated with each other (estimated $r = 0.73$, $p < .001$).

2.2.2. Internal consistency reliability

Internal consistency reliability was excellent for the shape/weight frequency subscale (both Cronbach's α and McDonald's $\omega = 0.98$), as well as the shape/weight duration subscale (both Cronbach's α and McDonald's $\omega = 0.98$).

2.3. Study 1 discussion

Findings from Study 1 revealed that it was necessary to make a distinction between shape/weight concerns and muscularity concerns, and that frequency and duration of these two constructs should be assessed separately. Given that muscularity is also a facet of the shape/weight items (i.e., muscle mass and/or tone can contribute to dissatisfaction with one's shape or weight), it is perhaps more appropriate to refer to this as a distinction between *general* shape/weight concerns and muscularity specific concerns. Specifically, a two-factor model comprising frequency and duration of general shape/weight concerns (i.e., Model 4b) provided superior fit to the data. Thus, Studies 2 and 3 focused validation of a more targeted questionnaire assessing frequency (20 items) and duration (20 items) of general shape/weight concerns. Nonetheless, future researchers are encouraged to investigate the separability of frequency and duration of more distinct forms of body dissatisfaction (e.g., muscularity, thinness, or leanness-oriented dissatisfaction; Karazsia et al., 2017; Ralph-Nearman & Filik, 2018, 2020; Smolak & Murnen, 2008).

Table 3
Standardized factor loadings from confirmatory factor analysis of the 40 BDFDQ items in Studies 1, 2, and 3.

Item	Item assessed on Frequency Dimension			Item assessed on Duration Dimension		
	Study 1	Study 2	Study 3	Study 1	Study 2	Study 3
1-Fearful while thinking my shape might change	.63	.72	.81	.72	.77	.77
2-Uncomfortable while thinking about how other people might perceive my weight	.82	.81	.86	.82	.86	.84
3-Insecure while thinking about how other people might perceive my shape	.81	.82	.84	.79	.85	.83
4-Dissatisfied while thinking about my shape	.86	.76	.85	.85	.80	.84
5-Repulsed while thinking I weigh too much	.87	.88	.88	.85	.87	.84
6-Anxious while thinking I might gain weight	.83	.81	.89	.83	.84	.85
7-Jealous while thinking other people are leaner than me	.77	.79	.82	.81	.78	.81
8-Envious while thinking other people weigh less than me	.80	.83	.84	.83	.82	.82
9-Revolted while thinking I have too much fat on my body	.87	.87	.87	.87	.87	.85
10-Annoyed while thinking about my inability to reach my goal weight	.87	.81	.84	.86	.86	.83
11-Guilty while thinking my weight has changed	.85	.85	.88	.85	.87	.89
12-Ashamed while thinking my shape has changed	.87	.89	.88	.85	.90	.88
13-Distressed while thinking about maintaining my shape	.80	.85	.85	.80	.84	.81
14-Stressed while thinking about maintaining my weight	.80	.85	.86	.82	.83	.83
15-Afraid while thinking my weight may change	.79	.82	.88	.81	.81	.86
16-Apprehensive while thinking I might become fat (or fatter)	.86	.86	.89	.88	.87	.87
17-Frustrated while thinking about my inability to attain my desired shape	.83	.83	.84	.79	.85	.84
18-Unhappy while thinking about my weight	.89	.86	.89	.87	.85	.85
19-Embarrassed while thinking other people might notice I have become fat (or fatter)	.88	.89	.86	.86	.88	.88
20-Mortified while thinking other people might notice I have gained weight	.87	.86	.88	.85	.84	.87

3. Study 2

To replicate and extend the findings of Study 1, the reduced 40-item BDFDQ assessing general shape/weight concerns was subsequently administered to a new group of participants. The predominant goal of Study 2 was to determine whether body dissatisfaction frequency and duration are meaningfully dissociable by establishing whether each component accounted for unique variance in trait body dissatisfaction. Additionally, Study 2 sought to verify that the dimensions of body dissatisfaction frequency and duration were indeed structurally separable. Furthermore, the opportunity was taken to establish additional psychometric properties of the BDFDQ, including measurement invariance across gender, internal consistency reliability, convergent validity with measures of body image and eating concerns, and divergent validity with measures of drive for muscularity.

3.1. Study 2 method

3.1.1. Participants

A total of 400 adults (200 men, 200 women) were recruited via the same means as Study 1 (i.e., CloudResearch). Participant characteristics were similar to Study 1, including age (*M* = 41.73, *SD* = 12.20, range 18–77), distribution of educational attainment (41% had earned a bachelor's degree, 18.8% had earned a postgraduate degree, 18.5% had completed secondary school, 14.2% earned an advanced diploma or diploma, 4.8% had completed trade school, and 2.8% had completed some secondary school), distribution of ethnicity (82.8% self-identified as Caucasian, 8.5% as African American, 4.3% as Asian, and 4.4% as other), BMI (*M* = 27.57, *SD* = 7.50, range 11.82–67.89), and history of eating disorders (5% reported having had a formal eating disorder diagnosis).[3] All participants were residing in the US at the time of the study and were financially reimbursed for their participation.

3.1.2. Procedures and measures

The procedure paralleled that of Study 1. Specifically, after providing informed consent and completing demographic items, participants were presented with directions for the 40-item BDFDQ. These directions were identical to those provided in Study 1 except for the definition of body dissatisfaction episodes. In this study, episodes of body dissatisfaction were defined as: *The experience of a negative feeling accompanying thoughts about one's body shape or weight*. A copy of the 40-item version of the BDFDQ is available in Appendix B. In addition to the 40-item BDFDQ, participants completed the five measures that follow in the order listed here:

3.1.2.1. Body dissatisfaction episode duration estimate. To obtain an estimate of the average duration of a single body dissatisfaction episode, participants were asked to report the likely duration of a single episode on a 6-point scale (*1 = less than one minute; 2 = a few minutes; 3 = up to half an hour; 4 = up to one hour; 5 = several hours; 6 = 24 hours or greater*).

3.1.2.2. Body Shape Questionnaire. The 34-item Body Shape Questionnaire (BSQ; Cooper et al., 1987) was employed to assess trait body dissatisfaction. Participants rated their tendency to experience body image concerns (e.g., "Have you been afraid that you might become fat or fatter?") over the past four weeks on a six-point response scale (*1 = never; 6 = always*). Higher summed scores reflected higher levels of trait body dissatisfaction. The BSQ has shown excellent reliability and validity within a wide range of populations (Kling et al., 2019). Internal consistency was high in the current sample (both Cronbach's α and McDonald's ω = 0.98).

3.1.2.3. Eating Disorder Examination Questionnaire. The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008) was employed to assess eating disorder symptomatology during the past 28 days. Subscale scores relating to dietary restraint, eating concerns, weight concerns, and shape concerns were derived from 22 items using a seven-point response scale. Computed as the average of these four subscales, higher global EDE-Q scores reflected greater levels of eating disorder symptomatology. The EDE-Q has shown adequate reliability and validity in community samples (Mond, Hay, Rodgers, & Owen, 2006; Mond, Hay, Rodgers, Owen, & Beumont, 2004). Internal consistency was high in the current sample (Cronbach's α = 0.91 and McDonald's ω = 0.92).

3.1.2.4. Drive for Muscularity Scale. The 15-item Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) was used to assess drive for muscularity (more specifically the pursuit of *hypermuscularity*). Participants rated their tendency to experience muscularity concerns (e.g., "I wish that I were more muscular") and to engage in muscularity-enhancing behaviors (e.g., "I lift weight to build up muscle") on a six-point response scale (*1 = never; 6 = always*). Higher average scores reflected higher drive for muscularity. This measure has shown good psychometric properties in both males and females (McCreary, Sasse, Saucier, & Dorsch, 2004). Internal consistency was high in the current sample (both Cronbach's α and McDonald's ω = 0.91).

3.1.2.5. Female Muscularity Scale. The 10-item Female Muscularity Scale (FMS; Rodgers et al., 2018) was used to assess drive for muscularity (more specifically the pursuit of a *toned and sculpted appearance*). Although the FMS was developed to better capture female appearance ideals related to muscularity, this measure is not gendered per se in its items and was therefore administered to participants of any gender. Participants rated their tendency to experience muscularity concerns (e.g., "I wish I were more toned") and to engage in muscularity-enhancing behaviors (e.g., "I exercise to sculpt more defined muscles") on a five-point response scale (*1 = never; 5 = always*). Higher summed scores reflected higher drive for muscularity. The FMS has shown good psychometric properties among university women (Rodgers et al., 2018). Internal consistency was high in the current sample (Cronbach's α = 0.92 and McDonald's ω = 0.91).

3.1.3. Analytic strategy

3.1.3.1. Factor structure and measurement invariance. A CFA (maximum likelihood estimation with the Satorra-Bentler scaled χ^2 statistic and robust standard errors) was conducted to test the intended two-factor correlated model with 20 items loading on the "Body Dissatisfaction Frequency" factor and 20 items loading on the "Body Dissatisfaction Duration" factor. The model also included 20 correlated error terms between frequency and duration versions of each item. Model goodness-of-fit was evaluated using CFI, TLI, and RMSEA fit index values.

The measurement invariance of this two-factor model was assessed across gender (women vs men). We tested invariance with respect to *configural invariance* (equal form), *metric invariance* (equal factor loadings), *scalar invariance* (equal intercepts), and *residual invariance* (equal error variances). A difference in CFI values of less than .01, and in RMSEA values of less than .015, between the configural model and the other models (e.g., configural model compared to the residual model) indicates invariance (Cheung & Rensvold, 2002).

[3] Age data were missing for 4 participants and BMI data were missing for 22 participants.

3.1.3.2. Internal consistency reliability. Cronbach's alpha (α) and McDonald's omega (ω) reliability coefficients were calculated, with values of .90 or higher judged as excellent (Groth-Marnat, 2009). BDFDQ subscale scores were computed by averaging across relevant items.

3.1.3.3. Convergent and divergent validity. Pearson correlations between BDFDQ subscale scores and BSQ, EDE-Q, DMS, and FMS scores were calculated. It was expected that the BDFDQ subscales would reveal convergent validity with a validated measure of trait body dissatisfaction (i.e., the BSQ) and global eating disorder symptomatology (i.e., the EDE-Q). In contrast, it was expected that the BDFDQ subscales would reveal relatively weaker associations with drive for muscularity measures (i.e., the DMS and FMS), in support for divergent validity.

3.1.3.4. Associations between body dissatisfaction frequency and duration and trait body dissatisfaction. A multiple regression analysis was conducted to determine whether body dissatisfaction frequency and duration were independently associated with trait body dissatisfaction. The BSQ scores were entered as the outcome variable and the frequency and duration subscale scores were entered as the predictor variables. Age, gender, BMI, and history of eating disorders were controlled for in the analysis.

3.2. Study 2 results

3.2.1. Factor structure and measurement invariance

CFA results indicated that the two-factor correlated model (with correlated error terms) displayed acceptable goodness-of-fit ($SB\chi^2$ = 1851.349 [*df* = 719], CFI =0.944, TLI =0.939, RMSEA =0.063 [90% CI =0.060–0.065]), with all items loading strongly (i.e., >.70) on their intended factor (see Table 5). The two factors (body dissatisfaction frequency and duration) were significantly and positively correlated with each other (estimated $r = 0.90$, $p < .001$). With regards to the invariance of this structure, results indicated that full configural, metric, scalar, and residual invariance were supported across gender (i.e., CFI and RMSEA values did not differ substantially [ΔCFI less than .01 and ΔRMSEA less than .015] between the configural, metric, scalar, and residual models). Fit index values for the invariance models are provided in Table 4.

3.2.2. Internal consistency reliability

Internal consistency reliability was excellent for both frequency and duration subscales (both Cronbach's α and McDonald's ω = 0.98 for both subscales) and this was comparable across women and men.

3.2.3. Convergent and divergent validity

Correlations between the BDFDQ subscales and the BSQ, EDE-Q, DMS, and FMS were consistent with our expectations. The body dissatisfaction frequency and duration subscales revealed excellent convergent validity with measures of body image and eating concerns (*r*-values ranged between .75-0.89). In support for divergent validity, the two subscales revealed relatively smaller associations with measures of drive for muscularity (*r*-values ranged between .17-0.38). All Pearson correlations between the administered measures are displayed in Table 5.

3.2.4. Associations between body dissatisfaction frequency and duration and trait body dissatisfaction

A multiple regression analysis (controlling for age, gender, BMI, and history of eating disorders) revealed that body dissatisfaction frequency and duration were independently associated with trait body dissatisfaction. Body dissatisfaction frequency accounted for a unique 15.1% of the variance in trait body dissatisfaction ($\beta = 0.71$, $p < .001$) and body dissatisfaction duration accounted for a unique 1.06% of the variance in trait body dissatisfaction ($\beta = 0.18$, $p < .001$). Variance inflation factor scores were all below 5, suggesting no discernible issues with multicollinearity among predictor variables (Akinwande, Dikko, & Samson, 2015). The overall model accounted for 81% of the variance in trait body dissatisfaction [$R^2 = .81$, $F(6, 367) = 259.27$, $p < .001$].

3.2.5. Body dissatisfaction episode duration estimate

The average duration of a single body dissatisfaction episode was approximately "*up to half an hour*" ($M = 2.91$; $SD = 1.45$). Majority of participants (72%) estimated durations less than or up to half an hour.

3.3. Study 2 discussion

Study 2 revealed that frequency and duration subscales accounted for unique variance in trait body dissatisfaction, indicating that these are meaningfully dissociable dimensions. It should be noted that while frequency contributed greater variance in trait body dissatisfaction than did duration, this does not preclude the possibility that each dimension associates with different disordered eating behaviors. Additionally, findings confirmed that frequency and duration represent structurally dissociable dimensions of trait body dissatisfaction. Moreover, the two-factor structure was found to be invariant across gender and both frequency and duration subscales had excellent reliability, convergent validity with measures of body image and eating concerns, and divergent validity with measures of drive for muscularity.

4. Study 3

Study 3 aimed to replicate and extend findings of Study 2 in a sample of Australian undergraduate students. The primary goal of Study 3 was to determine whether body dissatisfaction frequency and duration each predicted differing aspects of disordered eating behavior (i.e., binge eating and dietary restraint). Additionally, it was considered useful to determine the predictive capacity of the questionnaire measures of body dissatisfaction frequency and duration, in terms of their ability to predict in vivo (i.e., daily life) measures of body dissatisfaction frequency and duration as assessed by EMA.

4.1. Study 3 method

4.1.1. Participants

A total of 279 undergraduate students (216 women, 58 men, 2 non-binaries, 3 preferred not to say) were recruited via an online research participation system used by first-year psychology students at the University of Western Australia. The mean age of the sample

Table 4
Goodness-of-fit index values for the measurement invariance models of the 40-item BDFDQ (two-factor model + correlated error terms) across gender (female vs male) in Study 2.

Model	$SB\chi^2$	CFI	TLI	RMSEA (90% CI)	SRMR	AIC
Configural	2733.733(1438)	.929	.923	.067(0.064-0.070)	.059	39403.139
Metric	2790.990(1476)	.928	.924	.067(0.064-0.070)	.064	39363.549
Scalar	2849.964(1514)	.927	.924	.066(0.064-0.069)	.065	39320.734
Residual	2907.818(1554)	.926	.925	.066(0.063-0.069)	.066	39310.028

Table 5
Descriptive statistics and correlations among study variables in Study 2 and Study 3.

	Study 2 (N = 400)	Study 3 (N = 279)	Correlations					
Measure/scale	*M* (*SD*)	*M* (*SD*)	BD Frequency	BD Duration	BSQ	EDE-Q	DMS	FMS
BDFDQ Frequency	2.99 (1.38)	3.34 (1.45)	–	.86 ***	.90 ***	.87 ***	-0.07	.41 ***
BDFDQ Duration	2.68 (1.31)	2.87 (0.127)	.83 ***	–	.84 ***	.79 ***	-0.11	.34 ***
BSQ	83.00 (37.35)	93.28 (38.53)	.89 ***	.80 ***	–	.90 ***	-0.03	.43 ***
EDE-Q	1.79 (1.38)	1.89 (1.44)	.85 ***	.75 ***	.90 ***	–	-0.03	.44 ***
DMS	2.28 (0.92)	2.17 (0.96)	.17 ***	.21 ***	.22 ***	.23 ***	–	.58 ***
FMS	29.20 (9.70)	32.70 (10.50)	.38 ***	.34 ***	.38 ***	.41 ***	.72 ***	–

Note. BDFDQ = Body Dissatisfaction Frequency Duration Questionnaire, BSQ = Body Shape Questionnaire, EDE-Q = Eating Disorder Examination Questionnaire, DMS = Drive for Muscularity Scale, FMS = Female Muscularity Scale.
$p < .001$ ***, $p < .01$ **, $p < .05$ *. Correlations below the diagonal are from Study 2, those above the diagonal are from Study 3.

was 19.95 (*SD* = 3.56) and the mean BMI was 22.72 (*SD* = 5.60).[4] Participants self-identified as either Caucasian (46%), Asian (40%), or other (14%). Approximately 6% of the sample reported having had a formal eating disorder diagnosis.

4.1.2. Procedures and measures

The procedure paralleled that of Study 2. After providing informed consent, participants completed demographic items and self-report measures (i.e., BDFDQ, BSQ, EDE-Q, DMS, and FMS). For the purposes of the current study, additional measures of disordered eating behavior were taken from the EDE-Q. Specifically, responses on the 'food avoidance' item were used to provide a measure of dietary restraint, whereas responses on the objective binge eating (OBE) item were used to provide a measure of OBE. To adhere as close as possible to the DSM-5 criteria (American Psychiatric Association, 2013), clinically relevant OBE was defined as consuming an objectively large amount of food accompanied by a loss of control of eating, on average, at least once a week. The DSM-5 criteria additionally require that OBEs occur for at least three months; however, due to the structure of the EDE-Q, assessment of clinically relevant OBEs was restricted to the preceding month. Clinically relevant dietary restraint was defined as 'going without food for a period of eight or more waking hours…' on average three or more times per week, a criterion used by Mond et al. (2006).

After completing the self-report measures, participants were presented with comprehensive instructions for the EMA diary component of the study. This component of the study commenced the subsequent day and was carried out for seven consecutive days. At the end of the seven-day period all participants were compensated with partial course credit (participants who demonstrated compliance with the EMA diary across at least 6 out of the 7 days received bonus credit).

4.1.2.1. Ecological momentary assessment. The purpose of the EMA diary was to record in-the-moment experiences of body dissatisfaction episodes across the subsequent seven days via a smartphone application, which was developed specifically for the current study (CARE EMA Diary). Participants downloaded this smartphone application via the iTunes AppStore. Participants were instructed to record the experience of body dissatisfaction episodes as soon as such episodes occurred, via the CARE EMA Diary. After recording an episode, participants were presented with a question which required them to indicate whether prior to the episode they were engaging in one or more behaviors that commonly precede body dissatisfaction episodes (Fuller-Tyszkiewicz, 2019). Specifically, the options included: comparisons with someone perceived as more attractive, checking body in reflective surfaces, having conversations about appearance, exercising for at least 15 min for appearance-related reasons, comfort eating, and dieting. Participants were also informed that, after recording a body dissatisfaction episode, they would receive a notification prompt 30 min later to complete a follow-up survey concerning the duration of this episode. A 30-minute interval for the follow up survey was chosen as it was anticipated that episodes would typically last up to half an hour, i.e., results of Study 2 indicated that the average estimated duration of a single body dissatisfaction episode was approximately "*up to half an hour*." The follow-up survey commenced with the question of whether the body dissatisfaction episode was finished or ongoing. If participants indicated that the episode was finished, they were then presented with a single question concerning its duration (i.e., "How long did the body dissatisfaction episode last for?") assessed on a visual analogue scale ranging from 0 to 30 min. Ongoing episodes were coded as 30 min (i.e., these episodes lasted at least 30 min) and duration estimates of 0 min were recoded as 1 min (i.e., these episodes lasted up to 1 min). The notification-prompted survey was available to the participant via the CARE EMA Diary application for 10 min; in instances where no response was received during this 10-minute period, data were coded as missing. In addition, participants were informed that to be counted as a distinct body dissatisfaction episode, at least 30 minutes needed to have passed between the end of one episode and the start of a new episode. The CARE EMA diary application therefore restricted participants from completing further surveys until 30 minutes had passed. Participants were also required to "check-in" to the CARE EMA diary every evening across the seven-day period. This provided a measure of objective compliance with the EMA diary component of the study.

The measure of in vivo *frequency* was computed as the total number of times participants recorded a body dissatisfaction episode across the seven-day period. The measure of in vivo *duration* was computed as the average of all completed duration assessments across the seven-day period.

4.1.3. Analytic strategy

4.1.3.1. Replication of study 2 results. The factor structure, internal consistency reliability, and convergent and divergent validity of the BDFDQ were examined in the same manner as Study 2. In addition, the same multiple regression analysis was conducted to determine whether body dissatisfaction frequency and duration independently associated with trait body dissatisfaction.

4.1.3.2. Associations between body dissatisfaction frequency and duration and disordered eating behaviors. Two multinomial logistic regression analyses were used to determine whether body dissatisfaction frequency and duration were differentially associated with higher odds of clinically relevant levels of OBE and dietary restraint. Frequency and duration subscale scores were entered as predictor variables and the OBE and dietary restraint scores were entered as the outcome variables. The reference group was no binge eating/no dietary restriction. Age, gender, BMI, and history of eating disorders were controlled for in these analyses.

[4] Age data were missing for 1 participant and BMI data were missing for 3 participants.

4.1.3.3. Associations between questionnaire and in vivo measures of body dissatisfaction frequency and duration. Pearson correlations were conducted to establish associations amongst the questionnaire and in vivo measures of body dissatisfaction frequency and duration. Two multiple regression analyses were used to determine whether the questionnaire frequency measure predicted unique variance in the in vivo frequency measure and the questionnaire duration measure predicted unique variance in the in vivo duration measure. In these analyses, the questionnaire frequency and duration subscale scores were entered as the predictor variables and the in vivo frequency and duration scores were entered as the outcome variables. In addition to controlling for age, gender, BMI, and history of eating disorders, each analysis controlled for the other in vivo measure (e.g., analysis predicting in vivo frequency controlled for in vivo duration).

4.2. Study 3 results

4.2.1. Replication of study 2 results

CFA results replicated those of Study 2. The two-factor correlated model (with correlated error terms) displayed acceptable goodness-of-fit (SBχ2 = 1712.680 [*df* = 719], CFI = 0.941, TLI = 0.936, RMSEA = 0.070 [90% CI = 0.067–0.074]), with all items loading strongly (i.e., > .70) on their intended factor (see Table 5). The internal consistency reliability of the body dissatisfaction frequency and duration subscales were high (both Cronbach's α and McDonald's ω = 0.98 for both subscales), and a strong positive correlation between the two subscales was observed (estimated r = 0.87, p < .001).

Correlations between the BDFDQ subscales and the BSQ, EDE-Q, DMS, and FMS replicated patterns of associations shown in Study 2 (see Table 5). Specifically, the frequency and duration subscales revealed excellent convergent validity with measures of trait body dissatisfaction and global eating disorder symptomatology, and divergent validity with measures of drive for muscularity.

A multiple regression analysis (controlling for age, gender, BMI, and history of eating disorders) replicated the finding that body dissatisfaction frequency and duration each contributed unique variance to the prediction of trait body dissatisfaction. Body dissatisfaction frequency accounted for a unique 11.16% of the variance in trait body dissatisfaction (β = 0.67, p < .001) and body dissatisfaction duration accounted for a unique 1.25% of the variance in trait body dissatisfaction (β = 0.22, p < .001). Variance inflation factor scores were all below 5, suggesting no discernible issues with multicollinearity among predictor variables (Akinwande et al., 2015). The overall model accounted for 85% of the variance in trait body dissatisfaction [R^2 = .85, F(6, 274) = 247.85, p < .001].

4.2.2. Associations between body dissatisfaction frequency and duration and specific disordered eating behaviors

Over half of the sample did not engage in OBEs or dietary restraint (60.7 % and 54.9 %, respectively) over the prior 28 days, with the remainder engaging in occasional OBEs or dietary restraint (18.5% and 28.4%, respectively), or clinically relevant levels of OBEs or dietary restraint (20.7% and 16.7%, respectively). When the multinomial logistic regression analysis considered *OBE* as the outcome variable, it was revealed that trait duration *alone* was uniquely associated with greater odds of clinically relevant OBE (OR = 2.16, p = .004). When the multinomial logistic regression analysis considered *dietary restriction* as the outcome variable, it was revealed that trait frequency *alone* was uniquely associated with greater odds of clinically relevant dietary restriction (OR = 2.82, p < .001). Results from these analyses are presented in Table 6.

Table 6
Parameter estimates of regression models (Study 3).

	Model 1: State Frequency			Model 2: State Duration			Model 3: Clinically Relevant Objective Binge Eating[a]			Model 4: Clinically Relevant Dietary Restriction[a]		
	β	*B* (95% CI)	*p*	β	*B* (95% CI)	*p*	*B*	Odds Ratio (95% CI)	*p*	*B*	Odds Ratio (95% CI)	*p*
BDFDQ Frequency	.40	1.03 (0.29, 1.77)	.007	.33	2.23 (0.42, 4.05)	.016	.43	1.53 (0.97, 2.44)	.070	1.04	2.82 (1.60, 4.96)	.001
BDFDQ Duration	-0.19	-0.56 (−1.40,.29)	.194	.10	.78 (−1.29, 2.85)	.460	.77	2.16 (1.29, 3.62)	.004	.17	1.18 (0.66, 2.13)	.582

Note. All models tested in Study 3 include the following covariates: age, gender, history of eating disorders, and BMI. In addition, model 1 includes *state duration* as a covariate, and model 2 includes *state frequency* as a covariate.
β = standardized beta coefficient; *B* = unstandardized beta coefficient.
BDFDQ = Body Dissatisfaction Frequency Duration Questionnaire.
The reference category for models 3 and 4 is *no behavior*.
[a] Clinically Relevant OBEs = on average at least once a week. Clinically Relevant Dietary Restraint = on average three times per week.

Table 7
Aggregate breakdown of reported behavior frequencies across the 7-day EMA diary period (Study 3).

Behavior type	Reported frequency	Number of participants[a]	Percentage of participants endorsed
Comparisons with someone perceived as more attractive	236	98	54 %
Checking body in reflective surfaces	365	136	75 %
Having conversations about appearance	137	60	33 %
Exercising for at least 15 min for appearance-related reasons	75	42	23 %
Comfort eating	194	88	48 %
Dieting	109	54	30 %
None of the above	119	65	36 %

Note. After recording a body dissatisfaction episode via the CARE EMA Diary, participants were asked whether they were engaging in one or more of the above behaviors prior to the episode.
[a] Number of participants endorsing a specific behavior at least once.

4.2.3. Associations between questionnaire and in vivo measures of body dissatisfaction frequency and duration

EMA data revealed that approximately 73% of the sample (182 out of 248 participants) who completed both the initial survey and the EMA component of the study recorded *at least one* body dissatisfaction episode across the seven-day period. See Table 7 for an aggregate breakdown of behaviors reported by these 182 participants. The average frequency was 3.20 episodes (*SD* = 3.50), and the average duration per episode was 14.54 min (*SD* = 9.38). Compliance with the EMA diary was high, with an average of 89% compliance.

First-order correlations revealed that the questionnaire frequency measure was associated with both in vivo frequency and duration measures (r = 0.41 and r = 0.47, respectively, ps < 0.001). The questionnaire duration measure also associated with both in vivo frequency and duration measures (r = 0.32 and r = 0.43, respectively, ps < 0.001). When the multiple regression analysis considered in vivo *frequency* as the outcome variable, it was revealed that questionnaire frequency *alone* uniquely associated with in vivo frequency (semi-partial r^2 = .05, p = .007). When the multiple regression analysis considered in vivo *duration* as the outcome variable, once again it was revealed that questionnaire frequency scores *alone* uniquely associated with EMA duration (semi-partial r^2 = .03, p = .016). Results from these analyses are presented in Table 6.

4.3. Study 3 discussion

Findings from Study 3 replicated the two-factor structure of the BDFDQ, the excellent internal consistencies of the frequency and duration dimensions, convergent and divergent validity with various measures, and the finding that body dissatisfaction frequency and duration contribute unique variance in trait body dissatisfaction. Critically, findings were novel in revealing that body dissatisfaction frequency and duration are each associated with differing aspects of disordered eating behavior, indicating that there is clinical relevance in distinguishing the two dimensions. Specifically, while frequency was uniquely associated with greater odds of clinically relevant levels of dietary restraint, duration was uniquely associated with greater odds of clinically relevant levels of OBEs. Moreover, findings supported the predictive capacity of the BDFDQ, by showing that the questionnaire measures of body dissatisfaction frequency and duration predicted in vivo measures of body dissatisfaction frequency and duration.

5. General discussion

This work aimed to determine whether frequency and duration represent dissociable dimensions of trait body dissatisfaction. In order to do so, it was necessary to develop a new scale, the BDFDQ, capable of differentiating between frequency and duration of body dissatisfaction episodes. Together, the findings from the three studies presented here provide support for the new BDFDQ as a useful, valid, and reliable tool capable of independently assessing frequency and duration of body dissatisfaction episodes. Critically, using the BDFDQ, we showed that frequency and duration represent structurally and meaningfully dissociable dimensions underlying trait body dissatisfaction with clinical relevance in terms of the impact they exert on disordered eating behaviors.

Collectively, the findings from this suite of three studies support that frequency and duration represent structurally dissociable dimensions underlying trait body dissatisfaction across samples and gender. Moreover, although the samples included in Studies 1 and 2 were predominantly Caucasian, the sample included in Study 3 was more diverse and from outside of the U.S., providing additional support for the robust two-factor structure across demographic groups. In addition, across all three studies, the internal reliability of the frequency and duration subscales was excellent, providing further evidence of the strong psychometric properties of the scale.

As predicted, the BDFDQ frequency and duration subscales revealed very strong associations with other established measures of body image and eating concerns. These findings provide support for the scale as successfully assessing dimensions of general body dissatisfaction. Interestingly, the two measures of drive for muscularity included revealed weaker relationships with the BDFDQ frequency and duration subscales. Moreover, while the Female Muscularity Scale (FMS; Rodgers et al., 2018) revealed small to moderate relationships with higher BDFDQ frequency and duration, the Drive for Muscularity scale (DMS; McCreary & Sasse, 2000) revealed small to no relationship with the BDFDQ frequency and duration subscales. These measures differ in the sense that FMS focuses on the pursuit of a toned and sculpted appearance, while the DMS focuses more emphatically on building muscle mass in the pursuit of the stereotypically hypermuscular male appearance ideal. Therefore, it may be that among a general population sample (Study 2) and a predominantly female sample (Study 3) the pursuit of hypermuscularity might not be strongly associated with general body dissatisfaction.

Body dissatisfaction frequency and duration accounted for unique variance in trait body dissatisfaction across two independent samples (Studies 2 and 3), indicating that these are meaningfully dissociable dimensions of trait body dissatisfaction. Of course, it is important to note that in both Studies 2 and 3 frequency accounted for a greater proportion of variance in trait body dissatisfaction than did duration. This suggests that when completing measures assessing the tendency to experience body dissatisfaction 'in general', people most often respond in a manner that reflects their tendency to experience *frequent*, rather than *prolonged*, episodes of body dissatisfaction. Further, this demonstration that 'general' measures of trait body dissatisfaction confounded the assessment of body dissatisfaction frequency and duration highlights the utility of using measures that can differentiate between these two dimensions, such as the novel BDFDQ.

In support of the predictive capacity of the BDFDQ, data from the EMA in Study 3 revealed that the BDFDQ frequency and duration subscales associated with daily life measures of frequency and duration of body dissatisfaction episodes. In addition, the

questionnaire measure of frequency uniquely predicted in vivo frequency, as expected. However, against expectations, the questionnaire measure of duration did not uniquely predict in vivo duration. It is possible that duration of body dissatisfaction episodes varies greatly within individuals, and thus, the correspondence between questionnaire and in vivo measures of duration may be weakened as it is more difficult for individuals to appraise duration in general. Data from the EMA revealed various contextual factors (e.g., appearance comparisons, checking body in reflective surfaces) that contribute to body dissatisfaction episodes in daily life, and which may differentially influence the duration of such episodes. It will be important for future researchers to consider contextual factors in the assessment of frequency and duration of body dissatisfaction episodes in order to further refine the assessment of these two dimensions.

When examining the association between the BDFDQ subscales and self-reported disordered eating behaviors, a unique pattern of associations emerged such that typical *duration* of body dissatisfaction was associated with experiencing binge eating episodes, whereas the *frequency* of body dissatisfaction episodes was associated with dietary restriction. Although these findings are preliminary and should be replicated, they do provide initial support for the usefulness of examining frequency and duration of body dissatisfaction episodes separately, and suggest that they might be differentially related to disordered eating symptomatology. Thus, for example, it may be that the experience of prolonged body dissatisfaction is associated with an increased likelihood of engaging in disinhibited eating behaviors in an effort to disrupt the ongoing aversive experience of prolonged body dissatisfaction (Blackburn, Johnston, Blampied, Popp, & Kallen, 2006), while the experience of frequent episodes of body dissatisfaction is associated with increased efforts to restrict intake to decrease the occurrence of such episodes. This is consistent with emotion research suggesting that duration-based emotional disorder presentations (e.g., post-traumatic stress disorder) are associated with an increased tendency to engage in impulsive behaviors (Weiss, Forkus, Goncharenko, & Contractor, 2020), while frequency-based emotional disorder presentations (e.g., panic disorder) are associated with an increased tendency to engage in avoidance behaviors. Should distinct patterns of relationships between the frequency and duration of body dissatisfaction episodes and disordered eating behaviors be confirmed, this would have the potential to inform treatment interventions and increase our understanding of the etiology of different types of eating disorders.

The findings from this research present a number of important implications. Critically, this is the first program of research to conceptualize and assess the frequency and duration of body dissatisfaction episodes separately, and the findings strongly support that frequency and duration represent structurally and meaningfully dissociable dimensions of trait body dissatisfaction. Second, the findings indicate that the BDFDQ is a valid and reliable tool for assessing these dimensions and can be successfully employed in future research examining the role of frequency and duration of body dissatisfaction episodes in the development and maintenance of body image and eating concerns. Third, the findings provide initial support for the existence of distinct patterns of associations between the frequency and duration of body dissatisfaction episodes and different aspects of disordered eating behavior. One particularly intriguing possibility is that the presence of patterns of these dimensions within individuals, such that some might experience either more frequent or prolonged episodes of body dissatisfaction, has implications for differing vulnerability to developing restrictive or disinhibited eating behaviors. It may also be the case that high frequency and duration coexist, and this might lead to fluctuating patterns of restrictive food intake and disinhibited eating. These preliminary findings warrant additional investigation to confirm these patterns and to extend this work to understanding the ways in which frequency and duration of body dissatisfaction may be implicated in disordered eating symptomatology.

Despite these important implications, there are some limitations that should be noted. Firstly, the duration question was framed in a manner that implies forecasted rather than actual duration. In practice, however, it might be difficult to distinguish between forecasted and actual duration with evidence suggesting that individuals rely on past experiences as a guide in predicting future events (Schacter & Addis, 2007; Schacter & Madore, 2016). Arguably, the most accurate measure of actual duration can only be obtained via EMA, and thus it was reassuring to find a strong positive correlation (r = 0.43) between the questionnaire measure of duration and the EMA measure of duration in Study 3. Moreover, although three studies were conducted in separate samples, across different geographic locations, additional efforts to extend this work to other groups would be useful. In addition, although this research examined a number of important indices of validity and reliability, it did not assess stability across time which would be important. Finally, the samples included in these studies were not selected for higher levels of body image concerns and exploring how the scale performs in selected or clinical samples would also be useful.

In conclusion, the findings from the studies presented here provide strong support for the BDFDQ as a valid and reliable tool, and its usefulness as a measure of the frequency and duration of episodes of body dissatisfaction. In addition, the findings are supportive of future work exploring the respective contributions of these two dimensions to body image and disordered eating symptomatology. Further work seeking to clarify their respective contributions may have important implications for our understanding of the development and maintenance of these concerns.

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CRediT authorship contribution statement

Laura Dondzilo: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing. **Rachel F. Rodgers:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Matthew Fuller-Tyszkiewicz:** Conceptualization, Methodology, Writing – review & editing. **Lenny R. Vartanian:** Conceptualization, Methodology, Writing – review & editing. **Isabel Krug:** Conceptualization, Methodology, Writing – review & editing. **David A. Preece:** Methodology, Formal analysis, Writing - review & editing. **Jasmine MacLeod:** Methodology, Investigation, Writing - review & editing. **Colin MacLeod:** Conceptualization, Methodology, Writing – review & editing

Declaration of Competing Interest

The authors declare no conflict of interest

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.bodyim.2022.07.015.

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