

Trait body image flexibility as a predictor of body image states in everyday life of young Australian women

Weixi Tan^{a,1}, Naomi Holt^{b,1}, Isabel Krug^a, Mathew Ling^b, Bianca Klettke^b, Jake Linardon^b, Kimberley Baxter^b, Shelley Hemmings^b, Dominika Howard^b, Erin Hughes^b, Isabella Rivelli-Rojas^b, Matthew Fuller-Tyszkiewicz^{b,c,*}

^a Melbourne School of Psychological Sciences, The University of Melbourne, Melbourne, Victoria, Australia

^b School of Psychology, Deakin University, Geelong, Victoria, 3220, Australia

^c Center for Social and Early Emotional Development, Deakin University, Burwood, Victoria, 3125, Australia

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ABSTRACT

The present study evaluated whether individuals with varying levels of trait body image flexibility differ in the severity, variability, and correlates of state body dissatisfaction experienced in their daily lives. One hundred and forty-seven women completed a baseline measure of trait body image flexibility, followed by a 7-day ecological momentary assessment phase in which participants self-reported state body dissatisfaction, disordered eating behavior, drive for thinness, and appearance comparisons at 10 semi-random intervals daily. Higher trait body image flexibility predicted lower average scores, less frequent reporting of high state body dissatisfaction, and less variability in their state body dissatisfaction ratings. Individuals with higher trait body image flexibility were also less likely to engage in a range of behaviors and cognitions previously shown to produce body dissatisfaction, including upward appearance comparisons, drive for thinness, binge eating, and dieting. However, few of these state-based relationships involving body dissatisfaction and these related behaviors and cognitions were moderated by trait body image flexibility. Overall, this pattern of findings suggests that body image flexible individuals may have less negative body image because they are less inclined to engage in behaviors and cognitions in their daily lives that encourage negative body image.

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1. Introduction

In recent years, there has been growing interest in third-wave cognitive behavioral therapies (Hayes & Hofmann, 2017), an approach to therapy that focuses on the process of thinking, in order to achieve awareness and acceptance of thoughts, even if they are negative. This third-wave approach has introduced a collection of concepts and techniques that may be helpful for understanding the experience and treatment of eating and body image disturbances. One such concept is body image flexibility, which refers to the ability to experience potentially negative thoughts or feelings about one's body without attempting to avoid or change them (Sandoz, Wilson, Merwin, & Kate Kellum, 2013). A recent review by Rogers, Webb, and Jafari (2018) highlighted that individuals with higher

trait-level body image flexibility tended to report lower body dissatisfaction and less frequent engagement in disordered eating. Thus, it has been proposed that body image flexibility may act as a protective factor against negative body image and related outcomes. However, as the bulk of this accumulated literature derives from cross-sectional studies, the mechanisms through which flexibility influence body image remain largely speculative. The present study builds on this prior work by exploring body image experiences in daily life of individuals with differing levels of body image flexibility.

1.1. Flexibility as a coping strategy

In the acceptance and commitment therapy (ACT) literature, flexibility entails acting in accordance with one's values, even when faced with negative thoughts and feelings (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Within the context of body image, proponents of ACT might recognize appearance-changing behaviors (excessive exercise, taking diet pills, etc.) and disordered eating

* Corresponding author at: School of Psychology, Deakin University, Geelong, Victoria, 3220, Australia.

E-mail address: matthewf@deakin.edu.au (M. Fuller-Tyszkiewicz).

¹ Joint first-authors.

(binge eating, purging, dietary restraint, etc.) as dysregulated reactions to one's negative body image, rather than value-consistent behaviors. For instance, when appearance dissatisfied individuals engage in binge eating, they often do so: (a) in order to distract from aversive thoughts (Heatherton & Baumeister, 1991; Lavender et al., 2015), and (b) in spite of potentially held beliefs such as 'overeating is unhealthy' (Juarascio, Manasse, Schumacher, Espel, & Forman, 2017). Thus, techniques used to enhance an individual's psychological flexibility seek to disrupt the functional relationship between negative thoughts and subsequent value-incongruent behavioral responses. In contrast to other proposed appearance-related coping strategies (avoidance, appearance-fixing, and positive rational acceptance; Cash, Santos, & Williams, 2005), flexibility is not an attempt to evade or discredit negative appearance-related thoughts when they arise, nor does flexibility involve changing of one's appearance in order to reduce these negative feelings.

Evidence for the potentially beneficial role of body image flexibility in interventions for eating disorders is beginning to grow. Several studies have delivered ACT-based interventions that were designed to target eating disorder symptoms in threshold and subthreshold cases, and have reported significant pre-post improvements in body image flexibility (Berman, Morton, & Hegel, 2016; Hill, Masuda, Melcher, Morgan, & Twohig, 2015; Masuda, Ng, Moore, Felix, & Drake, 2016). Moreover, some studies have documented significant associations between increases in body image flexibility and reductions in disordered eating symptoms and body image concerns, suggesting that flexibility could potentially be a change agent for these intervention outcomes (Butryn et al., 2013; Masuda et al., 2016; Pellizzer, Waller, & Wade, 2018). However, as is common in pre-post intervention designs, these intervention studies did not permit testing of whether changes in flexibility led to subsequent improvement in disordered eating symptoms. Nor did these studies demonstrate that disordered eating episodes are now less common for these treated individuals when/if they experience elevated states of body dissatisfaction in their daily lives. Accordingly, these interventions provide direct evidence for the ability to enhance body image flexibility, and document possible downstream improvements in body image and disordered eating. However, these findings do not directly evidence disruption to the functional relationship between body dissatisfaction and disordered eating. It is also unclear why body dissatisfaction should reduce for individuals who become more flexible. Flexible individuals may be less judgmental and, hence, less frequently experience feelings of dissatisfaction towards their bodies (Ferreira, Pinto-Gouveia, & Duarte, 2011). Alternatively, they may become less reactive to the contextual factors that are known to promote body dissatisfaction, such as engagement in upward appearance comparisons (Ferreira et al., 2011; Ferreira, Trindade, & Martinho, 2016).

1.2. Proposed study and rationale

The present study used ecological momentary assessment (EMA; Shiffman, Stone, & Hufford, 2008) to more directly test whether individuals with elevated flexibility exhibit and react differently to negative body image experiences in their daily lives. Prior empirical and theoretical work enables prediction of how body image flexible individuals may experience body dissatisfaction in their daily lives.

Given the consistently demonstrated strong negative association in cross-sectional studies between trait body dissatisfaction and flexibility (Rogers et al., 2018), it is predicted that individuals with higher trait body image flexibility will report lower average state body dissatisfaction during the EMA phase of our study (Hypothesis 1). However, even if a negative relationship is

observed, there is potential ambiguity in the reason for this association. The negative relationship may arise because body image flexible individuals experience body dissatisfaction less often. If this *lower frequency interpretation* is correct, we would expect to observe that individuals with higher trait body image flexibility are less variable in state body dissatisfaction ratings (Hypothesis 2), and less frequently experience instances of state body dissatisfaction during the EMA phase (Hypothesis 3).

Insofar as body image flexible individuals are less reactive to negative experiences when they arise (Ferreira et al., 2011), several further predictions follow. Trait body image flexible individuals may be expected to – in general – engage less frequently in disordered eating cognitions (drive for thinness) and behaviors (binge eating, dieting, unhealthy eating, and upward appearance comparisons) (Hypothesis 4). This may also mean that – in the moment – the relationship between state body dissatisfaction and subsequent engagement in these disordered eating cognitions and behaviors is weaker for individuals with higher trait body image flexibility (Hypothesis 5). Finally, these disordered eating constructs are also likely to have implications for one's weight (in the case of unhealthy eating, dietary restraint, and binge eating episodes) and encourage consideration of how one's appearance does not currently meet their desired physique (desire for thinness, and upward comparisons); in turn, we may expect that these disordered eating constructs will influence state body dissatisfaction. Accordingly, we test the possibility that individuals with higher trait body image flexibility are less likely to experience body dissatisfaction increases following experience of the aforementioned eating disorder cognitions and behaviors (Hypothesis 6).

2. Method

2.1. Participants

Following approval from the Research Ethics Committee of two Melbourne-based universities (Deakin University and University of Melbourne), participants were recruited through social media and online advertisement to female university students and the public in Australia. One hundred and forty-seven women achieved inclusion criteria for the study by completing the baseline survey and at least 50% of the EMA surveys. This 50% lower limit equates to an average of five assessments completed per day, which is equivalent to the maximum completion number in many prior EMA studies in this field of body image disturbance (e.g., Fuller-Tyszkiewicz, 2019a, 2019b; Leahey & Crowther, 2008; Leahey, Crowther, & Ciesla, 2011). Further, the sample was limited to women in recognition that the majority of prior research in body image flexibility has relied on female samples (Rogers et al., 2018). The sample was aged between 18 and 42 years ($M=22.23$, $SD=4.95$) and with a mean body mass index (BMI) categorized as normal ($M=22.64$, $SD=4.20$). The demographics of this sample are reported in Table 1.

2.2. Materials

2.2.1. Trait-based measures

2.2.1.1. Demographics. Participants provided information regarding age, self-reported weight and height (through which BMI was calculated), sexual orientation, language, ethnicity, highest level of education, and employment status.

2.2.1.2. Trait body image flexibility. The Body Image-Acceptance and Action Questionnaire (BI-AAQ; Sandoz et al., 2013) is a 12-item measure designed to assess the extent to which an individual is affected by body image-related negative psychological experiences (e.g., "Worrying about my weight makes it difficult for me to live a

Table 1
Demographic Characteristics of the Sample (N = 147).

Demographic variable	Statistic
Age ($M \pm SD$)	22.23 \pm 4.95
BMI ($M \pm SD$)	22.64 \pm 4.20
Ethnicity (n, %)	
Australian – non-Aboriginal or Torres Strait Islander	77 (52%)
Asian	41 (28%)
British or European	20 (14%)
Pacific Islander, or other Oceania	3 (2%)
Australian Aboriginal or Torres Strait Islander	1 (1%)
Middle Eastern	2 (1%)
North American	2 (1%)
Central or Southern American	1 (1%)
Highest education completed (n, %)	
Still at Secondary School	1 (1%)
Year 12 or equivalent	73 (50%)
Certificate/Diploma	17 (12%)
Bachelor's Degree	40 (27%)
Postgraduate Degree	16 (11%)
Employment status (n, %)	
Employed	89 (61%)
Unemployed	58 (39%)
Primary language (n, %)	
English	121 (82%)
Other	26 (12%)
Sexual Identity (n, %)	
Only homosexual	4 (3%)
Mostly homosexual	1 (1%)
Bisexual	17 (12%)
Mostly heterosexual	32 (22%)
Only heterosexual	89 (61%)
Other	3 (2%)
Prefer not to answer	1 (1%)

Note. Percentages are based on complete data for demographic variables. M = mean, SD = standard deviation.

life that I value"). The responses were rated on a 7-point scale from 1 (*never true*) to 7 (*always true*). The scores were reverse-coded so that higher scores indicated higher trait body image flexibility levels, which were then summed. Possible scores range from 7 to 84. The BI-AAQ has shown a good internal consistency and construct validity in an undergraduate sample (Sandoz et al., 2013). In the present study, omega was 0.95, suggesting good internal consistency.

2.2.2. State-based measures

2.2.2.1. Body dissatisfaction. State body dissatisfaction was measured with the item "How satisfied are you with your appearance right now?" on a 11-point scale, ranging from 0 (*completely dissatisfied*) to 10 (*completely satisfied*). The item was reverse-coded with higher scores suggested greater state body dissatisfaction. This item was worded in terms of appearance rather than body specifically to emphasize satisfaction vs dissatisfaction with aesthetic elements of one's body. This single item approach has been used previously by studies investigating state body satisfaction (e.g., Fuller-Tyszkiewicz, 2019a, 2019b; Fuller-Tyszkiewicz, Dias, Krug, Richardson, & Fassnacht, 2018; Rogers, Fuller-Tyszkiewicz, Lewis, Krug, & Richardson, 2017).

2.2.2.2. Disordered eating behaviors. Participants were asked to indicate 1 (*yes*) or 0 (*no*) to the following questions since the last survey for (1) *Binge eating behavior*: A. Did you eat a large amount of food relative to what others would eat in the same situation? and B. Did you experience feelings of loss of control while eating? These two items were used based on prior work by Latner and Clyne (2008) suggesting that these are the two core diagnostic features

for binge eating episodes. When participants responded *yes* to both items, their scores were recoded as 1 (binge episode); all other possible combinations were coded as 0 (not a binge episode). (2) *Dieting behavior* was measured with the item, 'Did you consciously restrict food intake since the last survey?' (3) *Unhealthy eating behavior* was measured by asking, 'Did you eat unhealthy foods since the last survey?' This binary single-item approach is consistent with previous studies assessing disordered eating behaviors using EMA (Chia et al., 2018; Fitzsimmons-Craft, Ciao, & Accurso, 2016; Heron, Scott, Sliwinski, & Smyth, 2014; Holmes, Fuller-Tyszkiewicz, Skouteris, & Broadbent, 2014). Further, we asked participants to report instances of unhealthy eating without reference to examples of healthy vs unhealthy food types and quantities. This was by design, as we wanted to evaluate correlates of perceptions of unhealthy eating, and thus leave it to the participant to determine according to their understanding of unhealthy eating.

2.2.2.3. Drive for thinness. This construct was measured by having the participants respond to the item "Since the last survey, were you preoccupied with desire to be thinner?" on a 11-point scale, ranging from 0 (*Never*) to 10 (*Always*). Higher scores indicated greater drive for thinness.

2.2.2.4. Appearance comparison. Participants were asked to indicate the level of body comparison behavior they engaged in since the last time they were signaled on an 11-point scale, ranging from 0 (*no body comparisons*) to 10 (*constantly making body comparisons*). If participants responded with a value greater than zero, they were then prompted to indicate how they compared to their most recent comparison target: (1) *much worse*, (2) *worse*, (3) *the same*, (4) *better*, or (5) *much better*. As we were specifically interested in the relationship between upward comparisons and state body dissatisfaction, the direction of appearance comparison was recoded as upward comparisons (*worse*, *much worse*) = 1 and all other responses = 0.

2.3. Procedure

Following ethics approval, the study was advertised via social networking sites (Facebook, Gumtree, etc.) and through advertising in lectures and labs at the two universities. The study was advertised as a study exploring body image, sexting behavior (not included in the present manuscript), and disordered eating in daily life, and it was emphasized that the study comprised several parts (online survey and app-based surveys throughout the week). The concept of flexibility was not mentioned in this advertising.

Participants clicked on a weblink to access the plain language statement about the study and, if they consented to participate, were then directed to complete a baseline survey using Qualtrics. Embedded within this baseline survey were instructions for how to download the smartphone app to be used subsequently to monitor body image and disordered eating symptoms in daily life. The app InstantSurvey (Richardson, 2015b, b), which is available for iOS and android users, generates a random alphanumeric code which participants reported into the baseline survey to enable linking of data across app and Qualtrics surveys.

The survey was built within the InstantSurvey platform and was designed to commence signaling surveys to participants the morning after participants downloaded the app to their phones. Signals were scheduled to occur 10 times per day at semi-random intervals for a period of 7 days. Surveys were set to randomly signal within 1–2 h blocks to ensure sampling across the time-frame of 9am to 10 pm each day. Although prior state body image studies have typically used 3–6 assessments per day for the ESM phase (e.g., Fitzsimmons-Craft et al., 2016; Fitzsimmons-Craft et al., 2015; Leahey & Crowther, 2008; Leahey et al., 2011), 10 surveys within day were chosen in the present study to reduce time inter-

val between assessments. Recent work by Fuller-Tyszkiewicz et al. (2017) and Kockler, Santangelo, and Ebner-Priemer (2018) shows that spacing EMA time intervals too far apart can under-estimate the strength of relationship between predictor and outcome measure.

Each survey in the EMA phase was designed to be brief (approximately 1–2 min per survey) to balance participant burden from repeated assessment with desire to collect multiple assessments throughout the day. A semi-random interval schedule was preferred to avoid bias in predictability in fixed response scheduling (Napa Napa Scollon, Kim-Prieto, & Diener, 2003). The surveys were programmed such that participants had a 30-minute window to complete each survey before it expired. Participants received a \$10 gift voucher or course credit for participating; participants who completed at least 50% of the EMA surveys were entered into a draw to win one of five \$50 vouchers.

2.4. Data analytical plan

2.4.1. Data screening and preliminary analyses

There were minimal data missing in the present study. Less than 2% of cases had missing baseline data, and these were handled using expectation maximization (Tabachnick & Fidell, 2007). Participants differed in the number of EMA surveys they completed (out of a possible 70), but gave complete data when they did respond to a given survey. Threat to generalizability of results were explored by correlating the number of EMA surveys completed with scores on baseline variables (trait flexibility and demographic factors). All state-based variables used as outcomes in hypothesis testing (see below) were tested for time-related and reactivity effects given concerns that reports of these behaviors may be more common on specific days, at specific times of day, and/or later in the EMA assessment period (Fuller-Tyszkiewicz, 2019a, 2019b; Fuller-Tyszkiewicz, Richardson, Lewis, Smyth, & Krug, 2018). These time-based variables were included as covariates in main analyses for hypothesis testing when these timing variables were found to be significantly associated with the state-based outcome measure. For full details of these timing-related analyses, see the Supplementary File.

2.4.2. Hypothesis testing

All hypothesis testing was undertaken using multilevel modeling via the *lme4* package in R (Bates, Mächler, Bolker, & Walker, 2015). Hypothesis 1 was tested by regressing the random intercept reflecting individual differences in average state body dissatisfaction ratings onto trait body image flexibility. Individual differences in variability in state body dissatisfaction ratings (captured as a random effect for the error variance around individual intercepts for state body dissatisfaction ratings) were predicted by trait flexibility to test Hypothesis 2. Rather than providing a parameter that directly characterizes the relationship between flexibility and variability in state body dissatisfaction, this relationship is inferred by statistically comparing residual variance in state body dissatisfaction ratings for a model that includes flexibility as a predictor of variability vs a model without this predictor. State body dissatisfaction ratings were recoded into scores of 5 or above (high state body dissatisfaction) or below 5 (low state body dissatisfaction) and regressed onto trait body image flexibility to determine whether flexible individuals less frequently experience elevated state body dissatisfaction (Hypothesis 3). The cutting point of scores of 5 is based on prior work showing this value maximally differentiates individuals with elevated disordered eating symptoms from those without (Fuller-Tyszkiewicz, Dias et al., 2018, 2018b).

For Hypothesis 4, state-based disordered eating variables (appearance comparisons, binge eating, desire to be thin, and dietary restraint) were regressed onto trait body image flexibil-

Table 2
Descriptive statistics for state and trait-level variables.

Variable	%	<i>M</i>	<i>SD</i>
Binge eating	2	n/a	n/a
Dietary restraint	10	n/a	n/a
State body dissatisfaction > 5	34	n/a	n/a
Unhealthy eating	20	n/a	n/a
Upward comparisons	16	n/a	n/a
Desire for thinness	n/a	2.71	2.85
State body dissatisfaction	n/a	4.48	2.33
Trait body image flexibility	n/a	57.04	16.83

Note. *M* = mean, *SD* = standard deviation, n/a = not applicable.

ity to evaluate whether frequency (for appearance comparisons, binge eating, and restraint,) or level (desire for thinness) of these variables were associated with flexibility. Hypothesis 5 was tested by evaluating whether trait body image flexibility moderated the relationships between state body dissatisfaction ratings and subsequent engagement in the disordered eating variables. For this analysis, the state-based predictor (body dissatisfaction) was group-mean centered. The moderation effects were tested by regressing the random effect of state-based body dissatisfaction predicting disordered eating outcomes onto trait flexibility. Finally, Hypothesis 6 was tested across several multilevel models. In each, state body dissatisfaction was predicted by one of the proposed state-based risk or protective factors (appearance comparisons, binge eating, desire to be thin, dietary restraint, or exercise), trait body image flexibility, and the interaction between state risk factor and flexibility. In each of these models, state body dissatisfaction ratings at the previous time-point were included as a covariate so that the state-based predictor (e.g., appearance comparison) was predicting change in state body dissatisfaction. Further, state-based predictors were group mean-centered so that within- and between-person effects of the state-based predictor on the DV were disentangled. Group means were also entered in the above-mentioned models for completeness, but are not reported in main analyses as they do not directly relate to hypotheses. A binomial distribution was assumed for models with binary outcomes, and the Gaussian distribution was assumed for continuous outcomes.

3. Results

3.1. Preliminary analyses

3.1.1. Compliance

The average number of EMA surveys completed per participant was 52.120 (*SD* = 10.95). Compliance rates for EMA surveys and trait measures were significantly, yet weakly, related with BMI ($r = .185$, 95% CIs: 0.024, .337, $p = 0.025$), but unrelated to age ($r = 0.021$, 95% CIs: -.141, .182, $p = .801$), body image flexibility ($r = .102$, 95% CIs: -0.061, .259, $p = .221$), primary language ($t[32] = -0.193$, $p = .848$, Cohen's $d = .042$, 95% CIs: -0.382, .465), ethnicity ($F[7, 139] = 0.918$, $p = .494$, $\eta^2 = .044$, 95% CIs: 0.000, .062), level of education ($F[4, 142] = 0.690$, $p = .600$, $\eta^2 = .019$, 90% CIs: 0.000, .043), and employment status ($t[111] = -0.169$, $p = .866$, Cohen's $d = .029$, 95% CIs: -0.302, .359).

3.1.2. Descriptive statistics

Table 2 provides means and standard deviations for continuous variables, and frequencies for categorical variables used in main analyses. On average, there was moderate level of state body dissatisfaction, with 34% of reports exceeding 5/10. Binge eating was relatively infrequent, though unhealthy eating, upward comparisons and, to a lesser extent, dietary restraint were more frequently reported. The average level of trait body image flexibility for the present sample was above the scale midpoint.

3.2. Main analyses

3.2.1. Flexibility predicting state body dissatisfaction and disordered eating (Hypotheses 1–4)

Consistent with Hypothesis 1, higher trait body image flexibility predicted lower average state body dissatisfaction ratings across the EMA phase of the study ($b = -0.051$, 95% CIs: -0.067 , -0.035 , $p < .001$). Individuals with higher body image flexibility also tended to report lower variability in their state body dissatisfaction ratings over the measurement period ($\chi^2 = 36.49$, $p < .001$), supporting Hypothesis 2². This relationship is shown visually in Fig. 1.

Consistent with Hypothesis 3, individuals with higher trait body image flexibility less frequently reported experiencing high state body dissatisfaction ($b = -0.071$, 95% CIs: -0.098 , -0.044 , $p < .001$). Hypothesis 4 was partially supported, with trait body image flexibility predicting lower average engagement in disordered eating cognitions, such as desire for thinness ($b = -0.078$, 95% CIs: -0.096 , -0.060 , $p < .001$) and disordered eating behaviors, such as binge eating ($b = -0.057$, 95% CIs: -0.082 , -0.032 , $p < .001$), and upward appearance comparisons ($b = -0.070$, 95% CIs: -0.072 , -0.068 , $p < .001$) and dieting ($b = -0.056$, 95% CIs: -0.078 , -0.034 , $p < .001$). However, body image flexibility was not significantly related to unhealthy eating ($b = -0.008$, 95% CIs: -0.020 , $.004$, $p = .077$).

3.2.2. Moderating effect of trait body image flexibility on state-based relationships (Hypotheses 5–6)

Hypothesis 5 was partially supported, with results indicating a significant moderation effect for body image flexibility and state body dissatisfaction when predicting desire for thinness and upward appearance comparisons. While state body dissatisfaction (as a main effect) was associated with increased desire for thinness and likelihood of engaging in upward comparisons, these effects were weaker for individuals with higher trait body image flexibility. The interaction between trait body image flexibility and state body dissatisfaction was nonsignificant for all remaining disordered eating variables: binge eating, unhealthy eating, and dietary restraint. For these relationships with nonsignificant interaction effects, main effects of body image flexibility and state body dissatisfaction were both nonsignificant for the unhealthy eating outcome, whereas the main effect of body image flexibility but not state body dissatisfaction was significant for binge eating and dietary restraint. See Table 3 for full results.

Finally, support for Hypothesis 6 was mixed. Trait body image flexibility moderated the effect of desire for thinness on subsequent state body dissatisfaction, such that the main effect showed a positive relationship for the sample overall ($b = .068$, 95% CIs: 0.050 , $.086$, $p < .001$), but the interaction term indicated this effect was weaker for individuals with elevated trait body image flexibility ($b = -0.003$, 95% CIs: $-.005$, $-.001$, $p < .001$). Similarly, although the main effect revealed a positive relationship between upward appearance comparisons and subsequent increase in state body dissatisfaction ($b = .504$, 95% CIs: 0.392 , $.616$, $p < .001$), the interaction term showed this effect was weaker for individuals with elevated trait body image flexibility ($b = -0.006$, 95% CIs: -0.012 , -0.001 , $p = .027$).

However, trait body image flexibility also had a moderating effect in the opposite direction to expectation for binge eating. The main effect showed binge eating was associated with an increase

² Given that individuals with higher trait flexibility had lower average state body dissatisfaction ratings, it is possible that the lower variability in part reflects floor effects. As such, tests of variability prediction by flexibility were re-run after removing scores of 0 on the state body dissatisfaction rating variable. The predictive value of flexibility for individual differences in flexibility remained highly significant, suggesting the finding for Hypothesis 2 is not simply an artefact of truncated score ranges.

in state body dissatisfaction for the sample as a whole ($b = .773$, 95% CIs: 0.499 , 1.047 , $p < .001$), but the interaction term showed this relationship was stronger for individuals with higher trait body image flexibility ($b = .012$, 95% CIs: 0.001 , 0.024 , $p = .028$). Trait body image flexibility did not moderate the relationships between eating unhealthy and state body dissatisfaction ($b = -0.001$, 95% CIs: -0.005 , $.003$, $p = .346$), and dietary restraint and state body dissatisfaction ($b = -0.002$, 95% CIs: $-.010$, $.006$, $p = .263$). The main effect of eating unhealthily on increased state body dissatisfaction was significant ($b = .212$, 95% CIs: 0.130 , $.294$, $p < .001$), but the main effect of restraint leading to change in state body dissatisfaction was not ($b = -0.090$, 95% CIs: $-.221$, $.041$, $p = .089$).

4. Discussion

Despite growing interest in the concept of psychological flexibility as applied to body image, most studies have explored body image-related correlates of flexibility using cross-sectional designs (Rogers et al., 2018). Several recent studies have shown that improvements in body image flexibility are associated with level of improvement in intervention programs for body image and disordered eating (Butryn et al., 2013; Masuda et al., 2016). It has thus been argued that flexibility may in some way reduce the severity and/or experience of body dissatisfaction and disordered eating symptoms (Rogers et al., 2018). The present study provides some support for these proposed effects within the context of a sample of young women.

4.1. Main findings

Present findings broadly support the notion that young women with high trait body image flexibility experience body dissatisfaction and disordered eating less frequently in their daily lives, consistent with Hypotheses 1–4. In the case of body dissatisfaction, higher trait body image flexibility was associated with lower average state body dissatisfaction, less frequent occurrences of high state body dissatisfaction, and less variability in their state body dissatisfaction. Thus, it is not simply that young women have a lower set-point for state body dissatisfaction, but that they may less frequently engage in behaviors that otherwise elicit increased state body dissatisfaction, such as engaging in binge eating, upward appearance comparisons, or dietary restriction. Such a pattern of findings in the current study is consistent with prior evidence within the context of exercise motives, behavior, and body image outcomes, where trait dissatisfied women tended to engage in exercise more regularly for reasons that tend to lead to increased body dissatisfaction post-exercise (Fuller-Tyszkiewicz, Dias et al., 2018). More broadly, these state-based findings may also explain the cross-sectional correlations regularly observed between body image flexibility and both body image and disordered eating constructs (Rogers et al., 2018).

Although present findings suggest body image flexible individuals less often engage in disordered eating behaviors, there was limited support for the notion of disruption to the functional relationship between states of body dissatisfaction and subsequent disordered eating (Hypothesis 5). While body dissatisfaction-desire for thinness and body dissatisfaction-upward appearance comparison relationships were weaker for young women with elevated trait body image flexibility, moderating effects were not found for relationships involving dietary restraint, binge eating, or unhealthy eating as outcomes.

There are several plausible explanations for this limited support for reactivity-based effects predicted for trait body image flexible individuals. The sample may have comprised young women who

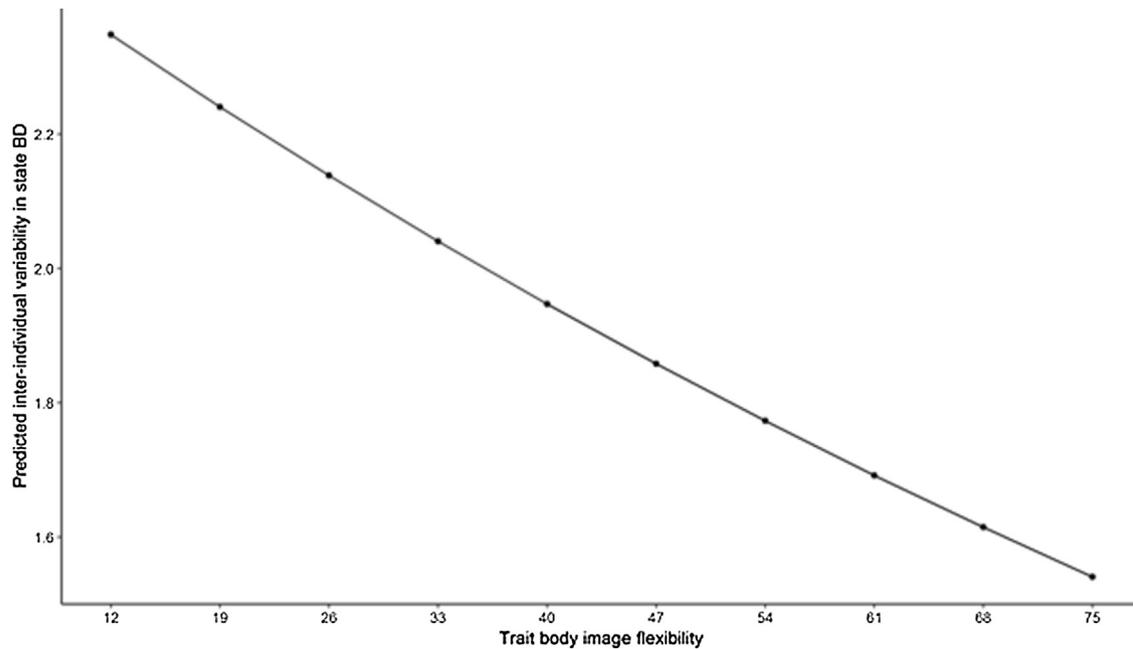


Fig. 1. Relationship between flexibility and state body dissatisfaction (BD) variability.

Table 3

Moderating effect of body image flexibility for the relationship of state body dissatisfaction predicting disordered eating variables.

	Binge eating		Ate Unhealthy		Desire for Thinness	
Predictors	b (95% CIs)	p	b (95% CIs)	p	b (95% CIs)	p
State BD	-.038 (-.199, .123)	.323	.009 (-.040, .058)	.363	.143 (.112, .174)	< .001
BIF	-.057 (-.082, -.032)	< .001	-.006 (-.018, .006)	.175	-.065 (-.085, -.045)	< .001
State BD × BIF	-.001 (-.009, .007)	.362	-.001 (-.003, .001)	.264	-.004 (-.006, -.002)	< .001
	Upward comparisons		Dietary Restraint			
Predictors	b (95% CIs)	p	b (95% CIs)	p		
State BD	.095 (.076, .115)	< .001	-.012 (-.088, .064)	.376		
BIF	-.049 (-.069, -.029)	< .001	-.050 (-.074, -.026)	< .001		
State BD × BIF	-.002 (-.004, .000)	< .001	.002 (-.002, .006)	.216		

Note. State BD = state body dissatisfaction (group-mean centered). BIF = trait body image flexibility. State BD × BIF = interaction between these variables. Group mean for state BD and reactivity covariates omitted from table for simplicity (information available from corresponding author upon request). b weights represent unstandardized coefficients. CI = confidence intervals.

are sufficiently flexible in their body image to less often experience body dissatisfaction and disordered eating and, in turn, are likely to have already lowered correlations between these constructs. Consistent with this view and with what may be expected when comparing individuals from the general population against individuals with an eating disorder (Striegel-Moore et al., 2009), more extreme disordered eating behaviors (binge eating and dietary restraint) were less commonly reported than less extreme disordered eating behaviors (eating unhealthy and upward appearance comparisons). Further, several of these relationships between state body dissatisfaction and disordered eating behaviors were non-significant for the sample of young women as a whole, leaving little room for the relationships to be weaker for more flexible individuals.

A related explanation for the null findings for disruption to the functional relationship between body dissatisfaction and disordered eating pertains to timing of assessment (e.g., see Timmons & Preacher, 2015 for discussion of the impact of timing on observed effects). Insofar as the sample comprises young women who are already flexible, then any relationship between state body dissatisfaction and disordered eating may have already been extinguished prior to participation in the study. The significant direct effects of flexibility are consistent with this view. Future research could explore this possibility further using a measure-

ment burst design (Sliwinski, 2008) in which capture of symptoms (and their relation) in daily life is undertaken at several points in time (e.g., a year apart) to evaluate within-person change in relationships as a function of change in trait body image flexibility.

Results were similarly mixed when exploring the moderating effect of body image flexibility for disordered eating variables predicting subsequent state body dissatisfaction (Hypothesis 6). For relationships involving direct engagement with appearance and, in particular, the thin ideal (desire for thinness and upward appearance comparisons), more flexible women were less likely to experience subsequent increases in state body dissatisfaction. However, for relationships involving disordered eating behaviors that may have implications for body image or may be engaged in as a solution to one's negative body image (binge eating, dietary restraint, and unhealthy eating), proposed moderating effects were not supported. Indeed, trait body image flexible women were actually more likely to experience dissatisfaction following engagement in binge eating. Thus, any moderation effects by flexibility may depend on how explicitly the contextual factor is related to body image. Consistent with this explanation, it is noteworthy that previous cross-sectional studies that have found moderating effects for body image flexibility have done so within the context of relationships between body dissatis-

faction and disordered eating (e.g., Ferreira et al., 2011; Moore, Masuda, Hill, & Goodnight, 2014; Sandoz et al., 2013). Further questions asking about whether individuals engaged in these disordered eating behaviors in aid of body image concerns or whether the actions subsequently focused their attention on their bodies may serve to confirm or disconfirm this conjecture.

4.2. Limitations

Present findings should be placed within the context of key design choices. In the interest of balancing breadth and frequency of assessment against participant burden, state-based constructs were captured using single-item measures (which is not uncommon for EMA studies). This means that nuances associated with the measured constructs may have been missed, such as the reasons for engaging in disordered eating. Similarly, the unhealthy eating item could have reflected quantity and/or type of food. While the wording intentionally left to the participant to interpret, the potential for different interpretations may have impacted present results. The chosen items also focused on problematic outcomes (disordered eating, body dissatisfaction, etc.), without consideration of more positive constructs such as adaptive or intuitive eating, lateral comparisons, body appreciation, and body acceptance (Tylka & Wood-Barcalow, 2015). Although this lack of consideration of positive body image constructs is consistent with the bulk of EMA studies to date (Fuller-Tyszkiewicz, 2019a, 2019b), future research should endeavor to provide greater coverage of positive and negative body image constructs for completeness.

Limitations of the current study also pertain to measurement of flexibility. Although the BIAAQ measure used in the present study is widely used, prior researchers (e.g., Rogers et al., 2018; Webb, Wood-Barcalow, & Tylka) have queried whether the measure adequately captures flexibility. Items are worded in terms of inflexibility and reverse scored, yet it is unclear whether absence of inflexibility is identical to presence of flexibility. Furthermore, body image flexibility was only measured at the trait level in the present study. As such, it was assumed that individuals are consistent in application of body image flexibility when body image threats are encountered. Unfortunately, adding a state-based measure of flexibility is not a simple matter because repeated questioning about how young women react to their state body image experiences may prompt or inhibit behaviors, undermining ecological validity of observed effects. Alternative designs may help to capture state body image flexibility. For instance, the articulated thoughts in simulated situations paradigm (Davison, Robins, & Johnson, 1983) could be used to encourage women to describe their level and use of flexibility across a variety of common situations they encounter in daily life. Qualitative investigation could also be used to encourage participants to describe in their own terms the experience of body image flexibility.

4.3. Implications

A key premise tested in the present study is that body image flexible young women have less negative body image because they are less reactive to risk factors that influence body image. Present findings instead offer more support for a direct effect of flexibility, such that young women with elevated flexibility experience and engage in these risk factors less frequently. A similar pattern has been demonstrated recently for the effects of exercise and body dissatisfaction (Fuller-Tyszkiewicz, Dias et al., 2018), and discussed more broadly in relation to the underwhelming evidence for the effects of trait body image on the relationship between state body

image and disordered eating (Fuller-Tyszkiewicz, 2019a, 2019b). The importance of this is that a key mechanism for change based on flexibility may be altering priorities that actively encourage pursuit of more positive cognitions and behaviors, or questioning of one's desire to maintain negative behaviors. It is worth noting that the prior intervention studies which demonstrated improvements in flexibility utilized third wave CBT principles that encouraged reflection on one's values in addition to other techniques (e.g., Hill et al., 2015; Pinto-Gouveia et al., 2017). Thus, changing values may have been the active component that led to change in disordered eating symptoms. More broadly, the present findings suggest that treatment modules encouraging body image flexibility may be a useful component for broader disordered eating treatment programs. Dismantling designs (e.g., Ahn & Wampold, 2001) in which the difference between two treatment groups in an RCT is the module of interest may be a sophisticated way to test this additive value of flexibility enhancing techniques in treatment contexts.

The negative association between body image flexibility and disordered eating cognition and behavior revealed in the present study is in line with some previous work which indicated that the non-acceptance of affective response and the avoidance-based coping has been contributed to greater eating disturbance (Duarte, Pinto-Gouveia, & Stubbs, 2017; Merwin, Zucker, Lacy, & Elliott, 2010). It has been theorized that people binge food to temporarily avoid their aversive self-awareness or negative internal thoughts and feelings, including those related to physical appearance (Heatherton & Baumeister, 1991), while dietary restraint is regarded as a way of escaping from internal feelings of fullness or body image-related shame or guilt (Merwin et al., 2010; Schmidt & Treasure, 2006). In this regard, the non-acceptance and unwillingness to experience potentially distressing body image-related thought and feelings (as may be expected for individuals with low body image flexibility) may be a predisposing factor that develops and maintains disordered eating symptoms (Duarte et al., 2017).

4.4. Conclusions

In summary, present findings show that young women with elevated trait body image flexibility are less likely to experience state body dissatisfaction and engage in disordered eating thoughts and behaviors in their daily life. There was also some evidence that, when experiencing dissatisfaction, they are less likely than lower flexibility individuals to engage in some common disordered eating-related outcomes (appearance comparisons and desire for thinness). Lack of support for proposed moderating effects for relationships between state body dissatisfaction and other disordered eating outcomes (binge eating and unhealthy eating) could signal that flexibility more readily acts as a protective factor by discouraging engagement in negative behaviors in general, rather than in specific response to increased state body dissatisfaction. Alternatively, the moderating effect found specifically for these disordered eating cognitions tied more explicitly to body image may signal that flexibility exerts greatest influence by disrupting the progression of negative, body image-related thought processes. Future studies should re-evaluate these state-based associations over time, in response to natural or intervention-prompted changes in trait flexibility to better understand how flexibility promotes positive body image and less disordered eating patterns. Generalizability of findings beyond young women, as sampled in the present study, is also warranted.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.bodyim.2019.07.006>.

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