

Appearance comparison and other appearance-related influences on body dissatisfaction in everyday life

Matthew Fuller-Tyszkiewicz^{a,b,*}, Julie Chhouk^a, Lorie-Ann McCann^a, Geovanny Urbina^a, Hao Vuo^a, Isabel Krug^c, Lina Ricciardelli^{a,b}, Jake Linardon^{a,b}, Jaclyn Broadbent^{a,b}, Kristin Heron^d, Ben Richardson^{a,e}

^a School of Psychology, Deakin University, Burwood, Victoria, 3125, Australia

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

^c School of Psychological Sciences, The University of Melbourne, Victoria, 3010, Australia

^d Department of Psychology, Old Dominion University, Norfolk, Virginia 23529, United States

^e Cairnmillar Institute, Hawthorn East, Victoria, 3123, Australia

ARTICLE INFO

Article history:

Received 30 June 2018

Received in revised form 3 January 2019

Accepted 3 January 2019

Available online 9 January 2019

Keywords:

Appearance comparisons

Body image disturbance

Experience sampling

Ecological momentary assessment

Internalization

ABSTRACT

Although appearance comparisons, self-monitoring, and appearance-related comments have been linked to body dissatisfaction in prior studies, the combined and unique influences of these variables on state body dissatisfaction in daily life has yet to be explored. The present study addressed this gap, and also evaluated whether these state-based effects were stronger for individuals with trait-level body image disturbances (internalization and body dissatisfaction). Eighty-four women completed baseline measures of trait internalization and body dissatisfaction, and then reported momentary experiences of body dissatisfaction, appearance self-monitoring, appearance-related comments, and appearance-based comparisons at up to 10 random times daily for seven days. Multilevel analyses confirmed that both appearance comparisons and commentary (both negative and positive) were predictive of changes in state body dissatisfaction when modelled individually as well as in a combined (full) model. Appearance self-monitoring was not a significant predictor, either individually or in the full model. These within-person relationships were not moderated by individual differences in trait body dissatisfaction and internalization of appearance standards. Accordingly, experiences of body dissatisfaction in daily life may be a common reaction to negative appearance comments and unflattering comparisons, yet positive comments and/or efforts to avoid appearance-based comparisons may have a positive effect on one's body image.

© 2019 Elsevier Ltd. All rights reserved.

1. Introduction

Body dissatisfaction levels in daily life are known to fluctuate (Fuller-Tyszkiewicz et al., 2015; Lattimore & Hutchinson, 2010), even among those with elevated trait body image disturbances (Fuller-Tyszkiewicz, Richardson, Lewis, Smyth, & Krug, 2018; Melnyk, Cash, & Janda, 2004). Accumulated literature has drawn upon theoretical frameworks such as objectification theory (Fredrickson & Roberts, 1997) and the tripartite influence model (van den Berg, Thompson, Obremski-Brandon, & Covert, 2002) and empirical findings from cross-sectional and experimental studies to identify potential predictors of state-like shifts in body dis-

satisfaction in daily life. Of these, perhaps the most commonly tested and supported predictor is appearance-based comparisons (e.g., Fardouly, Pinkus, & Vartanian, 2017; Fitzsimmons-Craft et al., 2015, 2016; Leahey & Crowther, 2008; Leahey, Crowther, & Mickelson, 2007). Several other appearance-related predictors (notably, appearance self-monitoring and appearance-related comments) have also been linked to state body dissatisfaction (2016, Fitzsimmons-Craft et al., 2015; Fuller-Tyszkiewicz, Dias, Krug, Richardson, & Fassnacht, 2018; Jones, Crowther, & Ciesla, 2014; Mills & Fuller-Tyszkiewicz, 2018), though there has been limited testing of these appearance-related predictors simultaneously. The present study contributes incrementally to this body of literature by evaluating: (a) individual and combined contributions of these appearance-related predictors of state body dissatisfaction, and (b) moderation of these state-based relationships by trait-level individual difference factors.

* Corresponding author at: School of Psychology, Deakin University, Burwood, Victoria, 3125, Australia.

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

1.1. Influence of personal experiences of the social environment on body dissatisfaction

The tripartite influence model (van den Berg et al., 2002) identifies peers, family, and the media as key sources of social influence on body image. These influences may be direct, via teasing and other general appearance-related comments (positive or negative), or instructions for how to attain a specific body size. These social influences may also be conveyed indirectly, for instance, via modelling of behavior from others. Objectification theory emphasizes that these sociocultural messages are persistent and pervasive, and have a sexually objectifying nature (Fredrickson & Roberts, 1997). These messages encourage women to internalize the objectifying observer's perspective of their body, both in terms of the importance of physical attractiveness and the need to strive for a highly idealized and unrealistic physique (the 'thin ideal'). This internalization manifests behaviorally as body self-surveillance and comparison with others, ultimately leading to dissatisfaction with one's appearance because the 'thin ideal' is unattainable for most women.

Extant literature broadly supports the role of these appearance-related factors in body dissatisfaction. Cross-sectional findings show that those with elevated trait body dissatisfaction more regularly engage in appearance-related conversations with others (Jones, Vigfusdottir, & Lee, 2004; Lawler & Nixon, 2011), appearance-related comparisons with more attractive individuals (Bailey & Ricciardelli, 2010; O'Brien et al., 2009), and self-monitoring of their appearance (Grippio & Hill, 2008). Trait body dissatisfied individuals are also more likely to report feelings of appearance-related self-consciousness in social contexts (Levinson & Rodebaugh, 2012), and are more likely to report being teased about their appearance (Menzel et al., 2010). Furthermore, experimental studies have demonstrated more negative body image following exposure to media portrayals of idealized physiques (Hausenblas et al., 2013) and objectifying contexts that make one self-conscious of how they look to others (Moradi & Huang, 2008).

More recently, researchers have used the experience sampling method (ESM) to explore influences on body dissatisfaction experienced in daily life. Although this approach is typically non-experimental, and hence does not control for extraneous influences as an experimental design would, participants self-report their current body dissatisfaction at a given moment in time as well as contextual variables (e.g., whether they were recently exposed to appearance-related comments or engaged in appearance comparisons), potentially enhancing ecological validity (Shiffman, Stone, & Hufford, 2008). Studies utilizing this approach have shown that state body dissatisfaction ratings are elevated following upwardly directed (i.e., against more attractive individuals) appearance comparisons (Fardouly et al., 2017; Fitzsimmons-Craft et al., 2015; Leahey & Crowther, 2008; Leahey et al., 2007; Leahey, Crowther, & Ciesla, 2011; Myers, Ridolfi, Crowther, & Ciesla, 2012; Ridolfi, Myers, Crowther, & Ciesla, 2011). There is also some evidence that comparisons to social media images rather than in-person, or to dissimilar targets, may have more pronounced effects on body dissatisfaction (Fardouly et al., 2017; Leahey & Crowther, 2008), although in an Australian context at least, evidence suggests that such comparisons may be less common in daily life than in-person comparisons (Fardouly et al., 2017).

Fewer studies have evaluated the effects of appearance-related comments and appearance self-monitoring on body dissatisfaction in daily life. However, the extant literature suggests that state body dissatisfaction is more common when an individual is focused on their appearance (Fitzsimmons-Craft et al., 2015; Stefano, Hudson, Whisenhunt, Buchanan, & Latner, 2016), and that engagement in appearance-related conversations may be associated with greater body dissatisfaction (Jones et al., 2014; Mills & Fuller-Tyszkiewicz,

2018). Jones et al. (2014) found that appearance-related conversations were also related to body self-monitoring. However, as the authors were interested in a specific form of appearance conversation (fat talk), the unique effects of positive and negative appearance-related comments on body dissatisfaction could not be ascertained. Fitzsimmons-Craft et al. (2015) showed that appearance-related comparisons and body self-monitoring were positively related, yet both were uniquely predictive of state body dissatisfaction contemporaneously. Body self-monitoring remained a significant predictor in lagged analyses (i.e., predicting body dissatisfaction at a subsequent time point), but appearance comparisons did not. It is worth noting, however, that body comparisons were operationalized in Fitzsimmons-Craft et al. (2016) as frequency of comparison, and direction of comparison was not factored into analyses. As participants were only assessed three times per day, it is also possible that the lengthy intervals between assessments led to under-estimation of the effects of these predictors on body dissatisfaction (e.g., see Fuller-Tyszkiewicz, Karvounis, Pemberton, Hartley-Clark, & Richardson, 2017 and Kockler, Santangelo, & Ebner-Priemer, 2018 for effects of timing on magnitude of state-based relationships).

1.2. Rationale and hypotheses for present study

The present study builds on this prior research in two key respects: (a) it explores the combined and relative contributions of these appearance-related predictors (self-monitoring, comparisons, and comments) on changes in state body dissatisfaction; and (b) it evaluates whether these relationships are moderated by trait-level differences in body image (specifically, internalization of the thin ideal and trait body dissatisfaction). With the exception of Fitzsimmons-Craft et al. (2016), we are unaware of any attempts to explore some combination of these appearance-related variables for predicting state-like shifts in body dissatisfaction in daily life. Given both the conceptual relation and empirical link among these proposed predictors, modelling of these predictors separately is likely to have overestimated the effects of each of these state-based influences separately, yet underestimated their combined influence on state body dissatisfaction. Consistent with prior research, it was predicted that state body dissatisfaction ratings would be higher following an upward comparison relative to pre-comparison state body dissatisfaction levels (Hypothesis 1). Similarly, it was predicted that negative appearance self-monitoring and appearance-related comments would be predictive of increased state body dissatisfaction (Hypotheses 2 and 3, respectively). However, it was expected that positive appearance-related comments would be predictive of decreased state body dissatisfaction (Hypothesis 4). It was also expected that, in combination, the predictors would account for more variance in state body dissatisfaction than any of these predictors modelled separately (Hypothesis 5). No hypothesis was formulated regarding which predictor would have the strongest unique contribution given the absence of prior literature to guide such predictions.

A secondary focus of the present study was to evaluate whether the strength of association between these appearance-related predictors and state body dissatisfaction depend on an individual's level of trait body image disturbance. Evaluation of potential trait-level moderators of state-based body image experiences is important because it may provide further insights into why exactly some individuals have greater body image disturbances than others. Guided by the premise that individuals with trait-level body image disturbances are more reactive to negative influences on body dissatisfaction, it was predicted that individuals who more strongly internalize the thin ideal and/or who are more dissatisfied with their appearance in general would experience stronger increases in state body dissatisfaction following expo-

Table 1
Demographic characteristics of the sample (N = 84).

Descriptive Variable	Statistic
Age ($M \pm SD$)	24.30 \pm 4.56
BMI ($M \pm SD$)	23.15 \pm 3.85
Culture (%)	
Australian	50.0%
Other	50.0%
Main Language (%)	
English	84.5%
Other	15.5%
Level of Education (%)	
Still at secondary school	1.2%
Year 12 or equivalent	19.1%
Certificate / Diploma	13.1%
Bachelor	46.4%
Post Graduate	20.2%
Employment Status (%)	
Yes	77.4%
No	22.6%
Work Hours ($M \pm SD$)	21.85 \pm 12.50

sure to upward comparisons, negative appearance comments, or through engaging in appearance self-monitoring (Hypothesis 6).

2. Method

2.1. Participants

Participants were women aged 18–40 recruited through social media and online advertisements to students at Deakin University. Although 108 women signed up for the study and downloaded the smartphone app used for data collection, 24 participants were excluded from the data analysis stage because they completed less than 50% of the experience sampling assessments ($n_{\max} = 70$ assessments). The decision was made to retain participants with at least 50% compliance as this equates to approximately five assessments completed per day, which appears to be towards the upper end of sampling frequency (and completion) for prior ESM studies of body image and appearance comparisons (e.g., [Leahey & Crowther, 2008](#); [Leahey et al., 2011](#)). This reduced the final sample to 84 women, which is sufficient to produce unbiased parameter estimates and standard errors for significance testing of clustered data according to prior simulation work (e.g., [Maas & Hox, 2005](#)). Demographic characteristics of the retained sample are shown in [Table 1](#).

2.2. Materials

2.2.1. Trait-based measures

2.2.1.1. Trait thin-ideal internalization. The 5-item thin-ideal internalization subscale of the Sociocultural Attitudes Towards Appearance Questionnaire – Version 4 (SATAQ4; [Schaefer et al., 2015](#)) was used to assess the extent to which participants endorse and accept cultural ideals of physical appearance (e.g., “I think a lot about looking thin”). Items were rated on a 5-point rating scale from 1 (*strongly disagree*) to 5 (*strongly agree*), and averaged to produce a total score. This subscale has been shown to be internally consistent, uni-dimensional, and correlate with measures of body image disturbance ([Schaefer et al., 2015](#)). In the present study, internal consistency was acceptable ($\omega = .76$).

2.2.1.2. Trait body dissatisfaction. The 9-item version of the Body Satisfaction subscale of the Body Change Inventory ([Mellor et al., 2010](#); [Ricciardelli & McCabe, 2002](#)) was used to assess level of dissatisfaction participants feel in general about their appearance. This scale assesses satisfaction with global aspects of appearance (such as weight, shape, and muscles) and body regions (chest, legs,

thighs, etc.). Responses were rated on a 5-point rating scale (*very unhappy* to *very happy*), reverse-coded, and then summed to form total scores with higher scores indicating higher body dissatisfaction. Psychometric adequacy of this scale has been demonstrated in previous studies (e.g., [Fuller-Tyszkiewicz et al., 2012](#)). Internal consistency was strong in the present study ($\omega = .88$).

2.2.2. State-based measures

2.2.2.1. State-based body dissatisfaction. Participants were asked to indicate their current level of body satisfaction on an 11-point rating scale from 0 (*completely dissatisfied*) to 10 (*completely satisfied*). Scores were reverse-coded so that higher scores indicated greater dissatisfaction. This single item approach is consistent with several prior investigations of body satisfaction (e.g., [Fuller-Tyszkiewicz, Dias et al., 2018](#); [Pomerleau & Saules, 2007](#); [Rogers, Fuller-Tyszkiewicz, Lewis, Krug, & Richardson, 2017](#); [Sonneville et al., 2012](#)).

2.2.2.2. Appearance self-monitoring. Participants were asked ‘Since the last time you were signalled, to what extent did you think about how you looked?’ rated on a scale from 0 to 10. This item has been used previously, and shown to correlate with body image and related constructs (e.g., [Holland, Koval, Stratemeyer, Thomson, & Haslam, 2017](#)).

2.2.2.3. State appearance comparison behavior. At each time point, participants were asked to indicate the level of body comparison behavior they had engaged in since they were last signaled (11-point sliding scale where 0 = *no comparisons*, 10 = *constantly making comparisons*). If participants responded with a value greater than zero, they were then prompted to indicate how they felt they compared to their most recent comparison target: (1) *much worse*, (2) *worse*, (3) *the same*, (4) *better*, or (5) *much better*. As per [Leahey and colleagues \(2011, Leahey & Crowther, 2008; Leahey et al., 2007\)](#), this second question serves as the measure of appearance-related comparisons for statistical modelling purposes. Responses were categorized as upward comparisons if participants selected options 1 or 2, lateral for option 3, and downward for options 4 or 5. The impact of upward comparisons is likely to depend on what it is compared against ([Drutschinin, Fuller-Tyszkiewicz, De Paoli, Lewis, & Krug, 2018](#)). Consequently, for present analyses, these appearance comparison categories were dummy coded such that upward comparisons (as reference category, value = 0) was compared against: (1) downward comparisons, (2) lateral comparisons, and (3) no comparisons.

2.2.2.4. Appearance-related comments. Participants were asked to indicate whether they had received positive or negative appearance-related comments since the last survey. Each response was coded as 1 (*yes*) or 0 (*no*), and both items were included in analyses.

2.3. Procedure

Following approval from the University’s Human Research Ethics Committee, the study was advertised via social networking sites (Facebook, Gumtree, etc.) and through advertising in lectures and labs at the university. Participants contacted the research team to arrange a time to come to our research lab for orientation and commencement of participation in the study. During this orientation session, participants received a plain language statement that outlined the process, requirements, and expectations of the study. They were given an opportunity to ask any questions about participation. Those who consented to participate then completed the baseline survey via Qualtrics on a computer provided to participants (Phase 1). Embedded within the baseline survey were

instructions for how to download the smartphone app to be used in Phase 2. The app, 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 Phases 1 and 2.

The app was built within the freely available survey platform InstantSurvey (Richardson, 2015a,b), 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 timeframe 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., 2015, 2016; Leahey & Crowther, 2008; Leahey et al., 2011), 10 surveys within day were chosen in the present study to reduce time interval between assessments. Recent work by Fuller-Tyszkiewicz et al. (2017) and Kockler et al. (2018) shows that spacing ESM time intervals too far apart can under-estimate the strength of relationship between predictor and outcome measure.

Each survey in the ESM 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 Scollon, Kim-Prieto, & Diener, 2003). The surveys were programmed such that participants had a 30-min window to complete each survey before it expired. After one week, participants were contacted and reimbursed with a \$20 gift voucher for their time commitment to the study.

2.4. Data analytical plan

2.4.1. Data screening and preliminary analyses

Data quality from both the baseline and ESM phases was checked prior to main analyses. Less than 2% of cases had missing baseline data (Phase 1). These missing values were imputed using expectation maximization (Tabachnick & Fidell, 2007). There were no incomplete data within time points for the ESM phase (Phase 2), although individuals differed in the number of assessments they completed of the possible 70 across the 7-day testing period. Rather than impute for missing time points, only those time points with data were included in analyses.

Individual differences in number of ESM surveys completed were explored in a variety of ways to contextualise potential impact of completion rate on the validity of main analyses. Correlations between number of assessments completed and scores on trait/demographic variables were conducted to assess potential biases in amount of data collected. The primary outcome variable (state body dissatisfaction) was also regressed on the day of participation (from first to seventh), day of week, and time of day (coded in hour blocks) to evaluate whether level of state body dissatisfaction systematically varied over time. As detailed in the Results section, there was no evidence of time-related effects on state body dissatisfaction, and hence no need to control for this in main analyses.

2.4.2. Main analyses

Study hypotheses were tested using multilevel modelling via Mplus version 7.2 to control for non-independence of data introduced by the repeated measures design of the present study (Hox, 2010). In all models (Hypotheses 1–6), Level 1 predictors were group-mean centered, and both the group-mean centred Level 1 predictor (representing within-person effects) and the group-mean (representing between-person effects) were entered as predictors of the DV (Enders & Tofghi, 2007). For models testing trait-level

moderation effects (Hypothesis 6), the trait-level predictors were entered grand-mean centered at Level 2.

Body dissatisfaction state scores at time t were regressed onto body dissatisfaction state scores from the previous time point (time $t-1$, to permit evaluation of change in this DV), as well as measures of appearance comparisons (upward vs no comparison, upward vs lateral, and upward vs downward comparisons, and frequency of comparisons as a covariate), appearance-related comments (positive and negative), and appearance self-monitoring at time t . As body dissatisfaction ratings were for the current moment, and all other variables asked about since the last assessment, this design permitted evaluation of prospective (or lagged) effects of these predictors on the DV, consistent with the primary aim of this study. Time lag between assessments was also included as a covariate given that the semi-random assessment schedule meant that the intervals between assessments were not equidistant. All analyses involving effects of these predictors and covariates on state-based body dissatisfaction were conducted within-day to further constrain the time lag between prior and current time points, consistent with the approach taken in prior ESM studies of body image (e.g., Fitzsimmons-Craft et al., 2015; Rogers et al., 2017).

The three state-level predictors (appearance comments, comparisons, and self-monitoring) were first modelled in separate models (Hypotheses 1–4), and then combined into a single model to evaluate their combined and relative contributions for predicting change in state body dissatisfaction (Hypothesis 5). Moderation of these state-based associations by trait-level body image variables (thin-ideal internalization and body dissatisfaction) were conducted for state-based relationships that were shown to significantly vary in magnitude across individuals (i.e., significant random effects). In cases where random effects were non-significant, it was concluded that the relationship between these state-based variables was comparable across individuals, and hence there was no basis for a moderation effect.

3. Results

3.1. Compliance rates and descriptive statistics

The average number of responses completed per participant (out of a possible 70) was 45.3 ($SD=11.7$), and the average interval between ESM assessments was 96 min ($SD=66$ min). Compliance rates for ESM surveys were not significantly related to BMI, $r(83)=.03$, $p=.805$ (two-tailed), employment status, $r(83)=.01$, $p=.957$ (two-tailed), or hours of work per week, $r(65)=-.23$, $p=.059$ (two-tailed), main language spoken at home, $r(83)=-.17$, $p=.114$ (two-tailed), highest level of education attained, $F(4, 79)=0.82$, $p=.515$, trait body dissatisfaction, $r(83)=.12$, $p=.283$ (two-tailed), or thin-ideal internalization, $r(83)=.03$, $p=.782$ (two-tailed). However, compliance was significantly related with age, $r(83)=-.29$, $p=.007$ (two-tailed) and whether an individual identified as having an Australian cultural background, $r(83)=.23$, $p=.039$ (two-tailed). Participants who were younger and/or of Australian background replied more frequently to the app-based alerts.

In total, state appearance comparisons were reported for 58.7% of assessment points. When daily appearance comparisons were reported, lateral comparisons were most common (60% of the time), followed by upward comparisons (29.5%), and downward comparisons (10.5%). Positive and negative appearance-related comments were considerably less frequent, reported for 7.5% and 0.9% of assessments overall, respectively.

As shown in Table 2, participants typically reported moderate levels of state body dissatisfaction, although there was considerable variability in these estimates both between and within individuals. On average, appearance self-monitoring and appearance compari-

Table 2
Descriptive Statistics for all Level-1 and Level-2 Variables.

Level	Variable	M	SD _W	SD _B	Possible range	ICC
Level 1	State body dissatisfaction	4.48	1.54	1.53	0–10	.49
	Appearance self-monitoring	2.73	2.08	1.82	0–10	.44
	Appearance comparison frequency*	2.83	1.75	2.02	0–10	.57
Level 2	Trait body dissatisfaction	26.61	n/a	6.48	9–45	n/a
	Trait internalization	3.07	n/a	0.76	1–5	n/a

Note. *Calculated for instances where appearance comparison was reported. M = mean. SD_W = within-person standard deviation; SD_B = between-person standard deviation. n/a = not applicable.

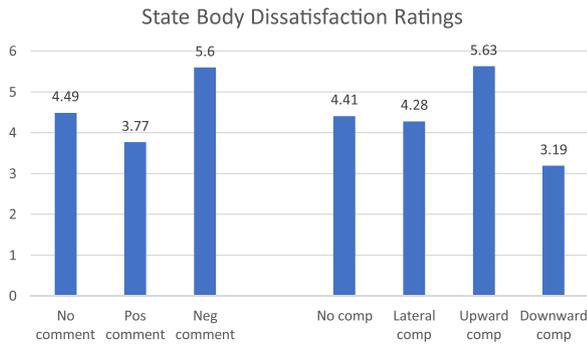


Fig. 1. State body dissatisfaction ratings by context. Comp = comparison.

son frequency were low, but this fluctuated both within and across individuals. The sample as a whole endorsed trait-levels of thin-ideal internalization and trait body dissatisfaction around scale midpoints, with reasonable spread around these central points.

State body dissatisfaction ratings were separated further according to comment (no comment, positive comment, or negative comment) and appearance comparison (no comparison, lateral comparison, upward comparison, or downward comparison) to evaluate how state body dissatisfaction varied across these conditions (see Fig. 1). Significance testing showed that, relative to ratings in the absence of an appearance comment, body dissatisfaction ratings were significantly lower following exposure to a positive comment, $z = -5.15, p < .001$, and higher following a negative comment, $z = 2.62, p = .009$. Relative to non-comparison contexts, body dissatisfaction ratings were significantly higher following an upward appearance comparison, $z = 6.36, p < .001$, and lower following a downward comparison, $z = -6.09, p < .001$. State body dissatisfaction ratings did not differ for non-comparison and lateral comparison contexts, $z = -0.87, p = .386$.

3.2. Reactivity and time-related effects on ESM assessments

Reactivity to the ESM protocol was explored by evaluating potential increased or decreased body dissatisfaction ratings across the testing period. MLM analyses revealed that order of assessment was unrelated to state body dissatisfaction scores, $b = .00, z = -0.46, p = .648$. In order to test for time of day effects, time was categorized by hour, with continuous coding from first possible hour to last (9:00–9:59a.m. = 0 to 9:00–9:59p.m. = 12), and treated as a predictor in multilevel models with state body dissatisfaction as the outcome variable. This model revealed a non-significant relationship between time of day and reported state body dissatisfaction, $b = .01, z = 0.48, p = .629$. Weekday (0 = Weekday, 1 = Weekend day, with Saturday and Sunday coded as weekend days) and day of assessment (first day, second day, ... seventh day) were both unrelated to state body dissatisfaction ratings, $b = .05, z = 0.42, p = .675$, and $b = 0.00, z = 0.02, p = .986$, respectively.

Table 3
Parameter estimates for each of the proposed appearance-related predictors tested separately.

Parameter	B	SE	p
Intercept	6.10	0.85	< .001
Comparison frequency (person-mean centered)	-0.02	0.03	.484
Comparison frequency (person-mean)	0.20	0.11	.054
Downward vs upward comp (person-mean centered)	-1.76	0.21	< .001
Downward vs upward comp (person-mean)	-2.47	1.82	.175
Same vs upward comp (person-mean centered)	-0.95	0.15	< .001
Same vs upward comp (person-mean)	-2.53	0.87	.004
None vs upward comp (person-mean centered)	-0.92	0.15	< .001
None vs upward comp (person-mean)	-2.11	0.98	.032
<i>R-squared estimate = .21</i>			
Intercept	4.82	0.22	< .001
Positive comment (person-mean centered)	-0.44	0.09	< .001
Positive comment (person-mean)	-6.80	2.10	.001
Negative comment (person-mean centered)	1.75	0.51	.001
Negative comment (person-mean)	4.62	4.56	.310
<i>R-squared estimate = .13</i>			
Intercept	3.89	0.34	< .001
Self-monitoring (person-mean centered)	0.02	0.02	.408
Self-monitoring (person-mean)	0.20	0.11	.066
<i>R-squared estimate = .10</i>			

Note. Comp = comparison. Covariates of time lag and state body dissatisfaction at prior time point are omitted from table to maintain focus on proposed predictor variables.

3.3. Main analyses

3.3.1. Individual predictors

Table 3 provides multilevel model results for each of the appearance-related predictors tested separately. Consistent with Hypothesis 1, state body dissatisfaction ratings significantly increased following instances of upward appearance comparisons relative to downward comparisons, lateral comparisons, and non-comparison events. The between-person effect of lateral vs upward and non-comparison versus upward comparisons also significantly predicted body dissatisfaction; those with a higher proportion of upward comparisons (relative to non-comparison and lateral comparisons) tended to have higher state body dissatisfaction ratings across the ESM phase. Comparison frequency was unrelated to body dissatisfaction, at either of the within- or between-person levels. Hypothesis 2 was not supported by present data as self-monitoring failed to predict changes in state body dissatisfaction. The person-mean for self-monitoring was also not predictive of state body dissatisfaction ratings across the ESM phase.

In support of Hypotheses 3 and 4, instances of positive comments were associated with decreased state body dissatisfaction whereas negative comments were followed by increased state body dissatisfaction. At the between-person level, those who received more positive appearance comments over the course of the ESM phase tended to report lower average state body dissatisfaction ratings. The between-person effect of negative comments was non-significant.

Table 4
Parameter estimates for the proposed appearance-related predictors tested together.

Parameter	B	SE	p
Intercept	6.35	0.83	< .001
Comparison frequency (person-mean centered)	−0.03	0.03	.286
Comparison frequency (person-mean)	0.47	0.17	.006
Downward vs upward comp (person-mean centered)	−1.61	0.22	< .001
Downward vs upward comp (person-mean)	−1.34	1.45	.356
Same vs upward comp (person-mean centered)	−0.88	0.14	< .001
Same vs upward comp (person-mean)	−2.29	0.85	.007
None vs upward comp (person-mean centered)	−0.90	0.15	< .001
None vs upward comp (person-mean)	−1.65	1.00	.099
Positive comment (person-mean centered)	−0.26	0.09	.002
Positive comment (person-mean)	−5.84	2.20	.008
Negative comment (person-mean centered)	1.49	0.38	< .001
Negative comment (person-mean)	−0.60	5.61	.915
Self-monitoring (person-mean centered)	0.01	0.02	.631
Self-monitoring (person-mean)	−0.24	0.14	.081

R-squared estimate = .30

Note. Comp = comparison. Covariates of time lag and state body dissatisfaction at prior time point are omitted from table to maintain focus on proposed predictor variables.

3.3.2. Combined model

Table 4 provides the results of the multilevel model testing all predictors simultaneously. Receiving positive and negative comments, as well as occurrence of upward comparisons remained significant unique predictors of changes in state body dissatisfaction (relative to down, lateral, and no comparison contexts). At the between-person level, individuals with greater frequency of appearance comparisons and more upward comparisons relative to lateral comparisons tended to report higher state body dissatisfaction across the testing period, whereas those who received more positive comments tended to report lower state body dissatisfaction. Consistent with Hypothesis 5, this full model accounted for more variance in state body dissatisfaction ratings ($R^2 = .30$) than any of the models with the predictors modelled separately (R^2 ranged from .10 to .21).

3.3.3. Trait-level moderators

Of the state-based predictors of body dissatisfaction, only the relationship between appearance self-monitoring and body dissatisfaction significantly varied across individuals. However, the magnitude of this state-based relationship was not significantly moderated by trait body dissatisfaction, $b = .00$, $z = 0.73$, $p = .463$, or thin-ideal internalization, $b = .00$, $z = -0.07$, $p = .947$. As magnitude of the other state-based relationships did not significantly vary across individuals, proposed moderators were not directly tested for these effects. Thus, Hypothesis 6 was not supported.

4. Discussion

Consistent with tenets of the tripartite influence model (van den Berg et al., 2002) and objectification theory (Fredrickson & Roberts, 1997), several common appearance-related behaviours (appearance-based comparisons, self-monitoring, and appearance-related comments) have been shown to predict state-like shifts in women's body dissatisfaction levels in daily life (e.g., Fardouly et al., 2017; Fitzsimmons-Craft et al., 2015; Jones et al., 2014; Leahey et al., 2007; Ridolfi et al., 2011). However, with the exception of Fitzsimmons-Craft et al. (2015, 2016), who included self-monitoring and appearance comparisons in the same model, there has been little attempt to integrate these findings into a consolidated model of predictors. Hence, the present study builds on this prior research by evaluating the unique and combined contributions of these appearance-related predictor variables for state-based fluctuations in body dissatisfaction. A secondary aim

was to determine whether these effects are more pronounced for individuals with trait body dissatisfaction or who internalize appearance standards.

4.1. Main findings

Present findings are consistent with prior studies (Fardouly et al., 2017; Fitzsimmons-Craft et al., 2015; Leahey et al., 2007; Leahey & Crowther, 2008; Myers et al., 2012; Ridolfi et al., 2011) in finding that negative upward comparisons are associated with state-based increases in body dissatisfaction. As per Fitzsimmons-Craft et al. (2015), appearance comparisons explained the most variance in state body dissatisfaction when modelled separately, though this amount was smaller than variance explained by all predictors combined (consistent with expectation). However, in the present study, appearance comparison variables remained significant predictors in the full model, controlling for other predictors. The inconsistency in results across the two studies may be due to operationalization of appearance comparisons; whereas the present study distinguished direction of comparison (upward, downward, and lateral), Fitzsimmons-Craft et al. (2015) measured in terms of frequency of comparisons – a variable that was also nonsignificant in the present study.

Also noteworthy in the present study is that within-person effects were observed regardless of whether upward comparisons were compared to downward, lateral, or no comparison contexts, although effects were strongest when upward comparisons were evaluated relative to downward comparisons. Although it may be reasoned that this contrast is likely to be greatest because downward comparisons should be most favourable and lead to reduction in state body dissatisfaction, this has not always been found in previous literature. Several studies have either found no relationship or negative effects of downward comparisons on aspects of body image and eating pathology (Drutschinin et al., 2018; Fitzsimmons-Craft, 2017; Lin & Kulik, 2002). Given this evident variability across studies, it is possible that the effect of downward comparison is moderated by other contextual factors, such as who the downward target is, or the extent to which this comparison then activates one's negative appearance-related schemas. Even so, the findings of greatest negative impact from upward comparisons – as found in the present study and prior work – suggests that efforts to actively discourage individuals from engaging in unrealistic comparisons may help to reduce body dissatisfaction experiences in daily life.

Exposure to appearance-related comments also predicted changes in state body dissatisfaction, with negative comments producing a similar increase in body dissatisfaction to that observed for upward comparisons. Positive comments reduced state body dissatisfaction, but this effect was much smaller than the magnitude of increase in state body dissatisfaction following exposure to negative comments. The benefits for body satisfaction of positive comments may be small because the focus on appearance – though well intended – may make appearance salient, and remind an individual of the ideal they are striving for as well as their distance from this ideal (Herbozo, Stevens, Moldovavn, & Morrell, 2017). It may also be the case that the impact of positive appearance comments may depend on who is delivering the comment and/or the perceived plausibility of the compliment. Unfortunately, the identity of the comment-giver and perceived credibility of the message were not measured in the present study to confirm or disconfirm these explanations. Further examination of the context of these comments and response to them is warranted.

Several predictions were not supported by present data. First, appearance self-monitoring (both within- and between-person) was not related to state body dissatisfaction when modelled separately or together with other predictors. Although Fitzsimmons-Craft et al. (2015) found within-person effects of

body surveillance to be a significant predictor of body dissatisfaction when modelled separately, it too was nonsignificant when modelled with other predictors. Thus, self-monitoring may be less influential in relation to the other predictors because appearance comments and comparisons may provide more direct validation or invalidation of one's perceived appearance. Second, only one of the state-based relationships (appearance self-monitoring predicting changes in state body dissatisfaction) was found to differ across individuals, and this variability was not moderated by trait-level body image variables (dissatisfaction and thin-ideal internalization). Thus, although it was posited that individuals with trait body image disturbances may be particularly vulnerable to negative appearance-related influences on state body dissatisfaction, this was not supported by the current data. Persistence of body image disturbances for these individuals may instead arise from greater frequency of engagement with behaviors and cognitions that intensify body dissatisfaction (e.g., Fuller-Tyszkiewicz, Dias et al., 2018; Leahey et al., 2007; Rogers et al., 2017).

Finally, there was some overlap in pattern of findings for within- vs between-individual effects of the appearance-related predictors for the model with all predictors entered simultaneously. Exposure to positive comments and engagement in lateral vs upward comparisons were predictive of body dissatisfaction both within- and between-persons, whereas self-monitoring was not a significant predictor at either level. However, a between-person effect was found for comparison frequency in the absence of within-person effect for this predictor, and negative comments had a within-person but not between-person effect on body dissatisfaction. Fitzsimmons-Craft et al. (2015) found a similarly complex mixture of significant and nonsignificant associations for between- vs within-person effects. Findings of significant within-person effects in the absence of supporting between-person effects may indicate that occurrence of these appearance-related experiences is more important than frequency of occurrence for predicting body dissatisfaction levels. Conversely, in cases where only the between-person effect was significant, this may signal that some effects that arise cross-sectionally (i.e., from between-person data) reflect tendency for constructs to reside in the same individual without causally influencing each other in daily life.

4.2. Limitations

Several design decisions warrant consideration. First, in the interest of balancing breadth and frequency of assessment against participant burden, state-based constructs were captured using coarse, single-item measures. This may have impacted magnitude of effects observed. For instance, the impact of appearance self-monitoring on body dissatisfaction may depend on whether the individual appraises their appearance with an ideal in mind, whether that ideal is realistic, and whether they feel they are close to this ideal. Relatedly, to ensure consistency with prior studies, the present study followed the approach of asking broadly about appearance comparison occurrence and direction as used in prior ESM studies (e.g., Leahey et al., 2007, 2011; Myers et al., 2012; Rogers et al., 2017), and thus did not differentiate comparisons made in-person vs via social media. Although these measurement decisions may have produced a less precise signal of true effects, the present findings still identified appearance commentary and comparisons as plausible risk factors for body dissatisfaction in daily life.

Second, the time course for state-based effects remains unclear. The present study utilized more frequent sampling within day (10 assessments) than prior studies, and were able to replicate findings of appearance comparisons predicting change in state body dissatisfaction. While this assessment schedule may enable evaluation of the impact of time lag on their state-based associations,

there is also risk that increased sampling adds to participant burden, in turn reducing data quantity and/or quality. It is encouraging then that there was limited evidence of time-related and reactivity effects on body dissatisfaction in the present study. Unfortunately, guidance is lacking on the ideal number of assessments per day for ESM studies; further trialling of different response schedules across studies may provide an empirical case for optimal design (Fuller-Tyszkiewicz et al., 2017).

4.3. Implications and future research directions

Present findings offer some support for generalizability of aspects of the tripartite influence model (van den Berg et al., 2002) and objectification theory (Fredrickson & Roberts, 1997) to the state-level. The bulk of accumulated evidence in support of these models derive from cross-sectional and prospective studies with measures that assess these appearance-based constructs in general rather than tying specific instances of exposure to appearance-related influences to body dissatisfaction outcomes. Hence, present findings (when coupled with other recent ESM studies) suggest that appearance-related comparisons and comments in daily life may have model-predicted effects on state body dissatisfaction. Even so, it is possible that the state-based version of these models deviate from or better explain what is observed at the trait-level. The null effect of appearance self-monitoring in the present study may indicate that this construct is less influential in-the-moment, or that its impact may overlap with other, more proximal influences. For instance, general awareness and self-monitoring of one's appearance may encourage comparison with others. To the extent that available others are closer to the ideal, such evaluations may produce body dissatisfaction. In instances where comparators are of similar appearance or less attractive, body dissatisfaction may reduce. In this way, self-monitoring may act as a catalyst for further evaluation, yet the outcome of such evaluations may depend on the current environment one faces.

ESM studies may offer further insights into the nature of the relationship between contextual factors and body dissatisfaction experiences in daily life. While present findings support the notion that direction of appearance comparisons may determine impact on state body dissatisfaction, frequency of appearance comparisons failed to significantly predict increases in state body dissatisfaction. Accumulated literature has yielded inconsistent results for the effects of appearance comparison when comparisons have been operationalised in terms of frequency of occurrence (Drutschinin et al., 2018; Fitzsimmons-Craft et al., 2016; Tiggemann & Polivy, 2010). A possible explanation is that greater frequency of comparisons leads to a habituation effect, such that one or several instances of comparison may have greater impact than many comparisons. Further testing of potential habituation effects is warranted, as it may lead to more accurate prediction of when comparisons (both upward and downward) are most likely to impact body image.

4.4. Conclusions

In summary, the present study offers further evidence to suggest that instances of upward appearance-related social comparisons may lead to increases in state body dissatisfaction. These findings seem robust to inclusion of other appearance-related factors shown to influence body dissatisfaction, but also show that the focus in prior studies on appearance comparisons may come at the expense of investigation of other body image constructs that also contribute to body dissatisfaction. Although fewer in number, accumulated studies suggest that appearance-related comments may also influence body dissatisfaction (e.g., Jones et al., 2014; Mills & Fuller-Tyszkiewicz, 2018). As noted earlier, further exploration of the content and context of these comments

is warranted. Studies that incorporate this broader range of predictors might also evaluate whether presence of a potentially positive influence (e.g., a favourable, downward appearance comparison) may counteract the effects on body dissatisfaction of recent occurrence of a negative influence (e.g., negative appearance comment). Such findings may enhance the ecological validity of, and understanding gained from, current models of body image disturbance.

Conflict of interest

The lead author is an Associate Editor for *Body Image*. None of the other authors have a conflict of interest to declare.

References

- Bailey, S. D., & Ricciardelli, L. A. (2010). Social comparisons, appearance related comments, contingent self-esteem and their relationships with body dissatisfaction and eating disturbance among women. *Eating Behaviors*, *11*, 107–112. <http://dx.doi.org/10.1016/j.eatbeh.2009.12.001>
- Drutschinin, K., Fuller-Tyszkiewicz, M., De Paoli, T., Lewis, V., & Krug, I. (2018). The daily frequency, type, and effects of appearance comparisons on disordered eating. *Psychology of Women Quarterly*, *42*, 151–161. <http://dx.doi.org/10.1177/0361684317732001>
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, *12*, 121–138. <http://dx.doi.org/10.1037/1082-989X.12.2.121>
- Fardouly, J., Pinkus, R. T., & Vartanian, L. R. (2017). The impact of appearance comparisons made through social media, traditional media, and in person in women's everyday lives. *Body Image*, *20*, 31–39. <http://dx.doi.org/10.1016/j.bodyim.2016.11.002>
- Fitzsimmons-Craft, E. (2017). Eating disorder-related social comparison in college women's everyday lives. *International Journal of Eating Disorders*, *50*, 893–905. <http://dx.doi.org/10.1002/eat.22725>
- Fitzsimmons-Craft, E., Bardone-Cone, A. M., Crosby, R. D., Engel, S. G., Wonderlich, S. A., & Bulik, C. M. (2016). Mediators of the relationship between thin-ideal internalization and body dissatisfaction in the natural environment. *Body Image*, *18*, 113–122. <http://dx.doi.org/10.1016/j.bodyim.2016.06.006>
- Fitzsimmons-Craft, E., Bardone-Cone, A. M., Wonderlich, S. A., Crosby, R. D., Engel, S. G., & Bulik, C. M. (2015). The relationships among social comparisons, body surveillance, and body dissatisfaction in the natural environment. *Behavior Therapy*, *46*, 257–271. <http://dx.doi.org/10.1016/j.beth.2014.09.006>
- Fredrickson, B. L., & Roberts, T.-A. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, *21*, 173–206. <http://dx.doi.org/10.1111/j.1471-6402.1997.tb00108.x>
- Fuller-Tyszkiewicz, M., Karvounis, T., Pemberton, R., Hartley-Clark, L., & Richardson, B. (2017). Determinants of depressive mood states in everyday life: An experience sampling study. *Motivation and Emotion*, *41*, 510–521. <http://dx.doi.org/10.1007/s11031-017-9620-z>
- Fuller-Tyszkiewicz, M., McCabe, M., Skouteris, H., Richardson, B., Nihill, K., Watson, B., ... & Solomon, D. (2015). Does body satisfaction influence self-esteem in adolescents' daily lives? An experience sampling study. *Journal of Adolescence*, *45*, 11–19. <http://dx.doi.org/10.1016/j.jadolescence.2015.08.009>
- Fuller-Tyszkiewicz, M., Skouteris, H., McCabe, M., Mussap, A., Mellor, D., & Ricciardelli, L. (2012). An evaluation of equivalence in body dissatisfaction measurement across cultures. *Journal of Personality Assessment*, *94*, 410–417. <http://dx.doi.org/10.1080/00223891.2012.662186>
- Fuller-Tyszkiewicz, M., Dias, S., Krug, I., Richardson, B., & Fassnacht, D. (2018). Motive- and appearance awareness-based explanations for body (dis)satisfaction following exercise in daily life. *British Journal of Health Psychology*, *23*, 982–999. <http://dx.doi.org/10.1111/bjhp.1234>
- Fuller-Tyszkiewicz, M., Richardson, B., Lewis, V., Smyth, J., & Krug, I. (2018). Do women with greater trait body dissatisfaction experience body dissatisfaction states differently? An experience sampling study. *Body Image*, *25*, 1–8. <http://dx.doi.org/10.1016/j.bodyim.2018.01.004>
- Grippio, K. P., & Hill, M. S. (2008). Self-objectification, habitual body monitoring, and body dissatisfaction in older European American women: Exploring age and femininity as moderators. *Body Image*, *5*, 173–182. <http://dx.doi.org/10.1016/j.bodyim.2007.11.003>
- Hausenblas, H. A., Campbell, A., Menzel, J. E., Doughty, J., Levine, M., & Thompson, J. K. (2013). Media effects of experimental presentation of the ideal physique on eating disorder symptoms: A meta-analysis of laboratory studies. *Clinical Psychology Review*, *33*, 168–181. <http://dx.doi.org/10.1016/j.cpr.2012.10.011>
- Herbozo, S., Stevens, S. D., Moldovann, C. P., & Morrell, H. E. R. (2017). Positive comments, negative outcomes? The potential downsides of appearance-related commentary in ethnically diverse women. *Body Image*, *21*, 6–14. <http://dx.doi.org/10.1016/j.bodyim.2017.01.008>
- Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: US: Routledge.
- Holland, E., Koval, P., Stratemeyer, M., Thomson, F., & Haslam, N. (2017). Sexual objectification in women's daily lives: A smartphone ecological momentary assessment study. *British Journal of Social Psychology*, *56*, 314–333. <http://dx.doi.org/10.1111/bjso.12152>
- Jones, D. C., Vigfusdottir, T. H., & Lee, Y. (2004). Body image and the appearance culture among adolescent girls and boys: An examination of friend conversations, peer criticism, appearance magazines, and the internalization of appearance ideals. *Journal of Adolescent Research*, *19*, 323–339. <http://dx.doi.org/10.1177/0743558403258847>
- Jones, M. D., Crowther, J. H., & Ciesla, J. A. (2014). A naturalistic study of fat talk and its behavioral and affective consequences. *Body Image*, *11*, 337–345. <http://dx.doi.org/10.1016/j.bodyim.2014.05.007>
- Kockler, T. D., Santangelo, P. S., & Ebner-Priemer, U. W. (2018). Investigating binge eating using ecological momentary assessment: The importance of an appropriate sampling frequency. *Nutrients*, *10*, 105. <http://dx.doi.org/10.3390/nu10010105>
- Lattimore, P., & Hutchinson, R. (2010). Perceived calorie intake and state body-image satisfaction in women attempting weight loss: A preliminary investigation. *Body Image*, *7*, 15–21. <http://dx.doi.org/10.1016/j.bodyim.2009.08.002>
- Lawler, M., & Nixon, E. (2011). Body dissatisfaction among adolescent boys and girls: The effects of body mass, peer appearance culture and internalization of appearance ideals. *Journal of Youth and Adolescence*, *40*, 59–71. <http://dx.doi.org/10.1007/s10964-009-9500-2>
- Leahey, T. M., & Crowther, J. H. (2008). An ecological momentary assessment of comparison target as a moderator of the effects of appearance-focused social comparisons. *Body Image*, *5*, 307–311. <http://dx.doi.org/10.1016/j.bodyim.2008.03.002>
- Leahey, T. M., Crowther, J. H., & Ciesla, J. A. (2011). An ecological momentary assessment of the effects of weight and shape social comparisons on women with eating pathology, high body dissatisfaction, and low body dissatisfaction. *Behavior Therapy*, *42*, 197–210. <http://dx.doi.org/10.1016/j.beth.2010.07.003>
- Leahey, T. M., Crowther, J. H., & Mickelson, K. D. (2007). The frequency, nature, and effects of naturally occurring appearance-focused social comparisons. *Behavior Therapy*, *38*, 132–143. <http://dx.doi.org/10.1016/j.beth.2006.06.004>
- Levinson, C. A., & Rodebaugh, T. L. (2012). Social anxiety and eating disorder comorbidity: The role of negative social evaluation fears. *Eating Behaviors*, *13*, 27–35. <http://dx.doi.org/10.1016/j.eatbeh.2011.11.006>
- Lin, L. F., & Kulik, J. A. (2002). Social comparison and women's body satisfaction. *Basic and Applied Social Psychology*, *24*, 115–123. http://dx.doi.org/10.1207/S15324834BASP2402_4
- Maas, C. J., & Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology*, *1*, 86–92. <http://dx.doi.org/10.1027/1614-2241.1.3.86>
- Mellor, D., Fuller-Tyszkiewicz, M., McCabe, M. P., & Ricciardelli, L. A. (2010). Body image and self-esteem across age and gender: A short-term longitudinal study. *Sex Roles*, *63*, 672–681. <http://dx.doi.org/10.1007/s11199-010-9813-3>
- Melnyk, S. E., Cash, T. F., & Janda, L. H. (2004). Body image ups and downs: Prediction of intra-individual level and variability of women's daily body image experiences. *Body Image*, *1*, 225–235. <http://dx.doi.org/10.1016/j.bodyim.2004.03.003>
- Menzel, J. E., Schaefer, L. M., Burke, N. L., Mayhew, L. L., Brannick, M. T., & Thompson, J. K. (2010). Appearance-related teasing, body dissatisfaction, and disordered eating: A meta-analysis. *Body Image*, *7*, 261–270. <http://dx.doi.org/10.1016/j.bodyim.2010.05.004>
- Mills, J., & Fuller-Tyszkiewicz, M. (2018). Nature and consequences of positively-intended fat talk in daily life. *Body Image*, *26*, 38–49. <http://dx.doi.org/10.1016/j.bodyim.2018.05.004>
- Moradi, B., & Huang, Y.-P. (2008). Objectification theory and psychology of women: A decade of advances and future directions. *Psychology of Women Quarterly*, *32*, 377–398. <http://dx.doi.org/10.1111/j.1471-6402.2008.00452.x>
- Myers, T. A., Ridolfi, D. R., Crowther, J. H., & Ciesla, J. A. (2012). The impact of appearance-focused social comparisons on body image disturbance in the naturalistic environment: The roles of thin-ideal internalization and feminist beliefs. *Body Image*, *9*, 342–351. <http://dx.doi.org/10.1016/j.bodyim.2012.03.005>
- Napa Scollon, C., Kim-Prieto, C., & Diener, E. (2003). Experience sampling: Promises and pitfalls, strengths and weaknesses. *Journal of Happiness Studies*, *4*, 5–34. <http://dx.doi.org/10.1023/A:1023605205115>
- O'Brien, K. S., Caputi, P., Minto, R., Peoples, G., Hooper, C., Kell, S., ... & Sawley, E. (2009). Upward and downward physical appearance comparisons: Development of scales and examination of predictive qualities. *Body Image*, *6*, 201–206. <http://dx.doi.org/10.1016/j.bodyim.2009.03.003>
- Pomerleau, C. S., & Saules, K. (2007). Body image, body satisfaction, and eating patterns in normal-weight and overweight/obese women current smokers and never-smokers. *Addictive Behaviors*, *32*, 2329–2334. <http://dx.doi.org/10.1016/j.addbeh.2007.01.027>
- Ricciardelli, L. A., & McCabe, M. P. (2002). Psychometric evaluation of the Body Change Inventory: An assessment instrument for adolescent boys and girls. *Eating Behaviors*, *3*, 45–59. [http://dx.doi.org/10.1016/S1471-0153\(01\)00044-7](http://dx.doi.org/10.1016/S1471-0153(01)00044-7)
- Richardson, B. (2015). *Instant Survey (iOS Version 2.3)* [Mobile application software] Retrieved from <https://itunes.apple.com/us/app/instant-survey/id95526674?mt=8>
- Richardson, B. (2015). *Instant Survey (Android Version 2.03)* [Mobile application software] Retrieved from <https://play.google.com/store/apps/details?id=au.edu.deakin.psychology.surveymframework>

- Ridolfi, D. R., Myers, T. A., Crowther, J. H., & Ciesla, J. A. (2011). Do appearance focused cognitive distortions moderate the relationship between social comparisons to peers and media images and body image disturbance? *Sex Roles*, 65, 491–505. <http://dx.doi.org/10.1007/s11199-011-9961-0>
- Rogers, A., Fuller-Tyszkiewicz, M., Lewis, V., Krug, I., & Richardson, B. (2017). A person-by-situation account of why some people more frequently engage in upward appearance comparison behaviors in everyday life. *Behavior Therapy*, 48, 19–28. <http://dx.doi.org/10.1016/j.beth.2016.09.007>
- Schaefer, L. M., Burke, N. L., Thompson, J. K., Dedrick, R. F., Heinberg, L. J., Calogero, R. M., . . . & Swami, V. (2015). Development and validation of the sociocultural attitudes towards appearance Questionnaire-4 (SATAQ-4). *Psychological Assessment*, 27, 54–67. <http://dx.doi.org/10.1037/a0037917>
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology*, 4, 1–32. <http://dx.doi.org/10.1146/annurev.clinpsy.3.022806.091415>
- Sonneville, K. R., Calzo, J. P., Horton, N. J., Haines, J., Austin, S. B., & Field, A. E. (2012). Body satisfaction, weight gain and binge eating among overweight adolescent girls. *International Journal of Obesity*, 36, 944–949. <http://dx.doi.org/10.1038/ijo.2012.68>
- Stefano, E. C., Hudson, D. L., Whisenhunt, B. L., Buchanan, E. M., & Latner, J. D. (2016). Examination of body checking, body image dissatisfaction, and negative affect using ecological momentary assessment. *Eating Behaviors*, 22, 51–54. <http://dx.doi.org/10.1016/j.eatbeh.2016.03.026>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn and Bacon.
- Tiggemann, M., & Polivy, J. (2010). Upward and downward: Social comparison processing of thin idealized media images. *Psychology of Women Quarterly*, 34, 356–364. <http://dx.doi.org/10.1111/j.1471-6402.2010.01581.x>
- van den Berg, P., Thompson, J. K., Obremski-Brandon, K., & Coover, M. (2002). The tripartite influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *Journal of Psychosomatic Research*, 53, 1007–1020. [http://dx.doi.org/10.1016/S0022-3999\(02\)00499-3](http://dx.doi.org/10.1016/S0022-3999(02)00499-3)