Appetite 180 (2023) 106310

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Tonight, I'm disordered eating: The effects of food delivery app use, loneliness, and mood on daily body dissatisfaction and disordered eating urges

Jade Portingale [a,*], Sarah Eddy [a], Matthew Fuller-Tyszkiewicz [b,c], Shanshan Liu [a], Sarah Giles [a], Isabel Krug [a]

[a] Melbourne School of Psychological Sciences, The University of Melbourne, Melbourne, VIC, Australia
[b] School of Psychology, Deakin University, Geelong, VIC, Australia
[c] Centre for Social and Early Emotional Development, Deakin University, Burwood, VIC, Australia

ARTICLE INFO

Keywords:
Food delivery apps
Loneliness
Mood
Disordered eating
EMA

ABSTRACT

With the recent proliferation of food delivery applications ('apps'; FDAs), accessing a meal is more convenient and immediate than ever. However, these apps may foster dysregulated eating behaviours, including maladaptive eating to cope with negative emotional states. Using ecological momentary assessment (EMA), the current study assessed whether FDA use at baseline predicted levels of EMA-assessed disordered eating urges and body dissatisfaction, whether negative mood and loneliness impacted disordered eating urges and body dissatisfaction at the state level, and whether the latter relationships were moderated by FDA usage frequency. Participants (N = 483; 78.7% women; 20.1% men; 1.2% other) completed a baseline questionnaire and were characterised as current FDA users (49.3%) or non-users (50.7%). Participants then completed a smartphone-facilitated investigation into their experiences of loneliness, negative mood, body dissatisfaction, and disordered eating urges, six times per day for 7-days. Across the entire sample, current FDA users at baseline reported greater EMA-assessed urges to overeat. At the state level, loneliness and negative mood predicted greater body dissatisfaction, with the latter also predicting greater urges for restrictive eating and overeating. Among current FDA users at baseline, at the state level, loneliness predicted greater body dissatisfaction, and negative mood predicted greater body dissatisfaction and urges for overeating. No moderating effects were observed for baseline FDA usage frequency. These results elucidate FDA use and daily experiences of loneliness and negative mood as factors elevating eating disorder (ED)-related risk. Further extensions of this research with nuanced measures of state FDA use are required.

1. Introduction

Increasing demand for convenience and the role of digital technology in everyday life has fuelled the recent proliferation of food delivery applications ('apps'; FDAs) such as UberEats, Deliveroo, and Menulog (Partridge et al., 2020; Tandon et al., 2021). These smartphone apps allow customers to order menu items from a range of foodservice outlets for pick-up or delivery by freelance couriers (Partridge et al., 2020). FDAs have also continued to gain popularity during the lockdowns instituted in response to the coronavirus disease 2019 (COVID-19) pandemic, as novel features such as 'contactless delivery' enable users to minimise their risk of exposure to the virus (Tandon et al., 2021). Despite such proliferation, researchers are yet to examine the potential negative impacts of FDA use on disordered eating symptoms. This is surprising, given that these platforms create an environment where highly palatable foods are abundant and easily accessible, which may foster dysregulated eating behaviours and cognitions and other related concerns such as body dissatisfaction, which are central factors in the aetiology of eating disorders (EDs; American Psychiatric Association, 2013; Stice, 2002).

* Corresponding author. University of Melbourne, North Melbourne VIC 3051, Australia.
E-mail address: jade.portingale@unimelb.edu.au (J. Portingale).

https://doi.org/10.1016/j.appet.2022.106310
Received 6 March 2022; Received in revised form 3 August 2022; Accepted 10 September 2022
Available online 17 September 2022

1.1. The effects of food delivery app use on body dissatisfaction and disordered eating

FDA use has increased rapidly among Australians over recent years, from an estimated two million to over four million users between 2018 and 2020 (Roy Morgan, 2018; 2020). Globally, young adults (aged 18–34 years) equate the majority (48.4%) of FDA users, with over 25% of Australians in young adulthood engaging with these apps (Bates et al., 2020; Morgan, 2020). This also coincides with the peak period for ED onset and risk (Potterton et al., 2020; Volpe et al., 2016). Convenience and ease of use have been identified as key reasons to engage with FDAs (Belarmino et al., 2021; Ray et al., 2019; Yeo et al., 2017). Such motivations for use, combined with the promotion, availability, and accessibility of highly palatable and energy-dense foods provided by FDAs, may have negative flow-on effects regarding eating pathology and related concerns such as body dissatisfaction on several fronts.

Firstly, this is because environments where highly palatable and hypercaloric foods are abundant and proliferate are known to contribute to dysregulated eating behaviours, cognitions, and affect characterised by excessive food consumption (Thomas et al., 2011; Witt & Lowe, 2014). Indeed, recent evidence suggests that FDA use is associated with greater fast-food consumption (Dana et al., 2021). Specifically, these environments may foster dysregulated behaviours such as chronic overeating and 'external eating' (i.e., eating in response to food-related stimuli, regardless of the internal state of hunger or satiety; Cortese et al., 2013; Davis et al., 2007), and cognitive-affective responses such as 'hedonic hunger' (i.e., desire or drive to consume food for pleasure, in the absence of physiological hunger; Lowe & Butryn, 2007). Theoretically, the repeated consumption of hyper-palatable foods may also progressively increase one's sensitisation to the incentive salience of such foods (Espel-Huynh et al., 2018). This may evoke 'wanting' (i.e., cue-induced subjective cravings to consume rewarding, hyper-palatable food; Morales & Berridge, 2020), and in extreme cases, the development of subjective loss of control whilst eating (Tanofsky-Kraff et al., 2011). Such behaviours, cognitions, and affect are defining characteristics of binge-eating psychopathology, which is a leading precipitant for clinically severe EDs—namely, binge-eating disorder (Wierenga et al., 2014) and bulimia nervosa (Elran-Barak et al., 2015). They also pose a risk for dietary restraint psychopathology which is a central risk and maintaining factor for binge-eating (Fairburn et al., 2003; Neumark-Sztainer et al., 2006) and stems from the constant focus on food consumption and decision making, and perpetual cognitive effort to combat the urge to eat (Bublitz et al., 2010). Neurobiological research has also established dietary restraint as a precipitant of binge-eating as it increases the responsivity of attention, reward, and motivation regions to the receipt of hyper-palatable foods (Espel-Huynh et al., 2018; Stice et al., 2013). Relatedly, FDA environments may also constitute ED-related risk, given the rewarding value of highly palatable food (Kidd & Loxton, 2018), and the relationship between hyper-reactivity to the hedonic properties of food (i.e., greater attentional bias to food cues and stronger approach motivation; Hennegan et al., 2013; Li et al., 2015) and disordered eating symptoms, including binge-eating (Eneva et al., 2017; Matton et al., 2013) and overeating (Davis et al., 2007).

Secondly, the abundance and availability of food choices provided by FDAs may facilitate emotionally-induced eating which is consistently implicated in the aetiology of binge eating symptoms (e.g., Klatzkin et al., 2018; Svaldi et al., 2012). This is because foods consumed in response to emotional states are usually highly palatable and energy-dense as they provide hedonic pleasure and instant reward, which may distract from negative emotions. Together, it is plausible that FDA use may be implicated in the onset and maintenance of disordered eating symptoms (i.e., binge eating and dietary restraint) and associated body dissatisfaction. Such investigations would enhance our understanding of symptoms that might foster risk for binge-eating disorder and bulimia nervosa.

1.2. The effects of negative mood and loneliness on body dissatisfaction and disordered eating

FDA use was positively associated with negative mood and loneliness during COVID-19 (e.g., Al Amin et al., 2021). These negative states were also exacerbated by the pandemic (Banerjee & Rai, 2020; Loades et al., 2020); with subsequent negative implications for body image and eating disturbance (Linardon et al., 2021). For instance, almost half of young adults experienced loneliness during COVID-19-related lockdowns (Loades et al., 2020). Moreover, research among a clinical ED sample (N = 207) found that the majority (83%) of participants reported worsening symptomatology during COVID-19; with difficulties regulating negative emotion identified as a leading precipitant of symptom deterioration (Vuillier et al., 2021). Therefore, there is precedent to understand the impacts of negative mood and loneliness on disordered eating symptoms and body dissatisfaction, and the role FDA use plays in these relationships.

According to the interpersonal model of binge-eating (Wilfley et al., 2000), difficulties with social functioning precipitate negative affect and low self-esteem, which in turn triggers binge-eating behaviours (or other features of EDs). That is, in an attempt to avoid, control, or reduce the distressing experience of negative affect in the short term by engaging in emotionally-induced disordered eating behaviours (Berg et al., 2013; Schaefer et al., 2020). Although not conceptualised within the model, negative affect may also trigger body dissatisfaction as individuals attempt to avoid, control, or reduce negative affect by focusing on their body shape and/or weight (Haedt-Matt & Keel, 2011). The interpersonal model of binge-eating (Wilfley et al., 2000) has received strong empirical support and has been considered pertinent in explaining binge-eating and ED psychopathology within both the community (Ansell et al., 2012; Elliott et al., 2010; Lo Coco et al., 2016) and binge-eating disorder samples (Ivanova, Tasca, Proulx, & Bissada, 2015). Support for the model was also found in individuals with anorexia nervosa, bulimia nervosa, and other specified feeding and EDs (Ivanova et al., 2015, 2017). Although scant, empirical (Russell et al., 2017; Shank et al., 2017) and longitudinal (Karam et al., 2020) research has provided support for the temporal development of variables within the model.

Recently, researchers have employed ecological momentary assessment (EMA) methodology to examine how an individual's physical and social environment and internal states predict momentary body image and eating disturbance (Smyth et al., 2009). This micro-longitudinal method of assessment involves the collection of real-time, momentary data in a participant's natural environment, thus limiting retrospective recall bias and maximising ecological validity (for an overview, see Shiffman et al., 2008). Moreover, recent EMA studies have demonstrated that participants' levels of disordered eating and body dissatisfaction demonstrate considerable within-person variability across one-to-two-week periods (Fuller-Tyszkiewicz et al., 2019; Goldschmidt et al., 2014; Mason et al., 2021). These findings provide evidence for the suitability of EMA to investigate ED-related constructs (e.g., disordered eating and body dissatisfaction) and support its utility in advancing current understandings of their state-level antecedents. Such undertakings may serve to advance theoretical perspectives and refine interventions by identifying novel modifiable factors that are relevant for reducing state body dissatisfaction and disordered eating-related risk.

Existing EMA studies have supported the relationship between components of the interpersonal model of binge-eating (Wilfley et al., 2000) at the state level. For instance, momentary elevations in negative affect were found to predict binge-eating behaviour (Ambwani et al., 2015; Berg et al., 2013; Mason et al., 2016) and momentary worsening of body dissatisfaction (Srivastava et al., 2021). Interpersonal problems were also shown to predict state binge-eating behaviour and negative affect (Mason et al., 2016; Ranzenhofer et al., 2014), and moderate the relationship between negative affect and binge-eating (Ambwani et al.,

2015). Given that potential relationships between components of the interpersonal model may vary on a momentary level, EMA is an ideal methodology to study the effects of negative mood on disordered eating symptoms and body dissatisfaction.

Research also suggests that loneliness, defined as an intense emotional response to perceived social isolation (Killeen, 1998), plays a salient role in the aetiology of ED psychopathology (Levine, 2012). Although not previously considered in conjunction with the interpersonal model of binge-eating (Wilfley et al., 2000), theoretically, loneliness is believed to function like negative affect; that is, individuals may engage in maladaptive eating behaviours to modulate the distressing feeling of loneliness (Mason et al., 2016). Although scant, cross-sectional research has supported positive associations between loneliness and disordered eating behaviours within the community (Mason et al., 2016) and clinical ED samples (Harney et al., 2014; Richardson et al., 2017; Southward et al., 2014); and between loneliness and body dissatisfaction within the community (Barnett et al., 2020; Zinovyeva et al., 2016) and at-risk for ED samples (Sinton et al., 2012). In one of the few EMA studies to date to examine the effects of loneliness on eating pathology in everyday life, perceived social isolation was related to more frequent binge-eating among non-clinical women ($N = 65$; Mason et al., 2016). Hence, future research examining how loneliness may manifest into disordered eating symptoms and body dissatisfaction throughout daily life is sorely needed.

1.3. The current study

Using EMA, the present study aimed to examine, for the first time, whether current FDA use at baseline, as well as state loneliness and negative mood, predicted disordered eating symptoms and body dissatisfaction throughout daily life. A further aim was to assess the moderating effects of baseline-assessed FDA use frequency on the relationships between negative mood and loneliness with disordered eating symptoms and body dissatisfaction. Such research undertakings would enhance insight into whether and/or why certain individuals respond differently to such negative states and specific behaviours that might be linked to disordered eating symptoms. As FDAs enable the convenient and immediate consumption of highly palatable food, drawing from the interpersonal model (Wilfley et al., 2000), frequent FDA use may function as a means to alleviate feelings of negative mood and loneliness through disordered eating behaviours and a focus on body image (i.e., body dissatisfaction). Therefore, it is plausible that these relationships may be more pronounced for those who use these services more frequently.

Given that the severity of eating pathology can vary from clinically severe EDs to sub-clinical forms of disordered eating experienced within the general community, and clinically significant ED psychopathology (e.g., dietary restraint, binge-eating etc.) can occur within the community (Hart et al., 2011), examining a community-based sample holds utility. As this study focused on a community sample, disordered eating urges were assessed as a proxy measure for actual disordered eating behaviours. Such undertaking may also better inform prevention and early intervention strategies for common disordered eating behaviours, such as restrictive eating and overeating, which are known precursors to binge-eating episodes (Masheb & Grilo, 2006; Stice, 2002). To assess the current aims, participants first completed a baseline survey assessing demographic and trait variables (i.e., current FDA usage and frequency of FDA usage; Phase 1), followed by an EMA investigation into state mood, loneliness, body dissatisfaction, and disordered eating urges (Phase 2).

As illustrated conceptually in Fig. 1, it was hypothesised that:

H1). Current FDA users would report higher levels of EMA-assessed body dissatisfaction and disordered eating urges (restrictive eating and/or overeating) than those who did not use FDAs.

H2). Higher levels of state-based (H2a) loneliness and (H2b) negative mood would predict increases in state-based body dissatisfaction and disordered eating urges (restrictive eating and/or overeating).

H3). Among current FDA users, higher levels of state-based (H3a) loneliness and (H3b) negative mood would predict increases in state-based body dissatisfaction and disordered eating urges (restrictive eating and/or overeating).

H4). Among current FDA users, the frequency of FDA use (at baseline) would moderate the relationships between state-based (H4a) loneliness and (H4b) negative mood with state-based body dissatisfaction and disordered eating urges (restrictive eating and/or overeating); such that the relationships would be stronger among those who engaged more frequently than those who engaged less frequently.

2. Method

2.1. Participants

Following approval from the Human Research Ethics Committee at a university in Melbourne, 930 participants were recruited through the university's Research Experience Program and various research and social media platforms within the wider community. Among those who completed the baseline assessment ($N = 930$), 630 completed the EMA phase. Participants ($n = 147$) who completed less than 50% of the EMA

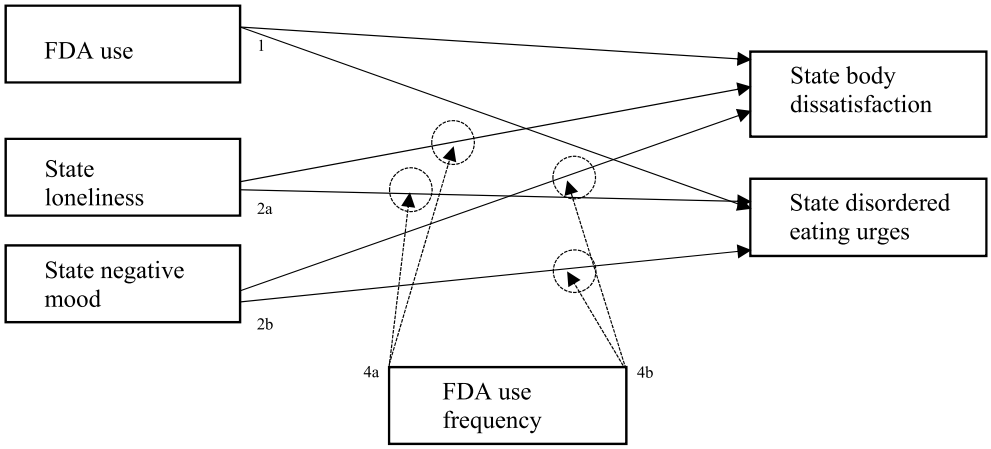

Fig. 1. Conceptual model of proposed relationships among FDA use, negative mood, and loneliness with disordered eating urges and body dissatisfaction. Perforated lines and circles reflect moderation effects; hard lines indicate direct relationships. Hypothesis 3 is not shown in the figure above as it reflects the same relationships as Hypothesis 1 (total sample) among the subset of current FDA users.

surveys were excluded to reduce biased results due to systematic differences in completion (Shiffman et al., 2008), and to ensure that the average time interval between assessments was not too long as to miss the state-based effect. Retained participants in the present study completed a comparable number of surveys to prior EMA studies that observed effects between state-based ED-related variables (e.g., Fuller-Tyszkiewicz et al., 2019; Griffiths & Stefanovski, 2019; Tan et al., 2019). The final sample comprised 483 participants (78.7% women; 20.1% men; 1.2% other), aged 18–76 years. Thirty-two participants presented with a lifetime ED diagnosis. The demographic characteristics of the final sample are summarised in Table 1.

2.2. Materials

2.2.1. Baseline: Demographics and trait-level measures

Demographics. Participants' self-reported their age, gender, current height and weight (to calculate body mass index [BMI]), cultural background, primary language, marital status, sexual orientation, highest level of education completed, and lifetime (current/prior) ED diagnosis. Participants' also indicated whether they recently used FDAs (*yes/no*) and if so, answered questions regarding the type of FDA (e.g., *UberEats, Deliveroo, DoorDash* etc.), frequency of usage (i.e., *once a month, multiple times a month, once a week, multiple times per week, once a day, multiple times per day*), and any COVID-19 related changes to FDA usage. Consistent with related research regarding social networking app usage (Strubel & Petrie, 2017) and accepted practices for grouping ordinal frequency data (Privitera, 2022), participants' were characterised as *FDA users* if they currently used FDAs at least multiple times a month (i.e., > once a month), and *non-users* if they did not currently use FDAs or only engaged with these services once a month. This cut-point was also deemed suitable following an examination of the distribution. Among *FDA users*, frequency of usage was quantified as ordinal data on a 5-point scale from 1 (least frequent usage; i.e., *multiple times a month*) to 5 (most frequent usage; i.e., *multiple times a day*).

Eating Pathology: The Eating Attitudes Test-26 (EAT-26; Garner et al., 1982) assessed participants attitudes and behaviours related to eating. The EAT-26 consists of 26 items rated on a 6-point scale from 0 (*never*) to 5 (*always*), with a total score ≥20 reflecting a high level of ED risk. Internal consistency for this scale was strong in the present study (Cronbach's alpha = .93).

Body Image Concern. The Body Shape Questionnaire (Cooper et al., 1987) measured participants body weight and shape concerns across 16 items rated on a 6-point scale from 1 (*never*) to 6 (*always*). Higher scores indicate greater body image concerns.

2.2.2. EMA: State-level measures

Negative Mood. Participants were asked, "How happy are you right now" using an 11-point scale from 0 (*not at all*) to 10 (*extremely*) with responses reverse-coded so that higher scores indicated greater negative mood. This single-item approach is consistent with related EMA studies that assessed negative mood (Fuller-Tyszkiewicz et al., 2020; Portingale et al., 2022).

Loneliness. Participants were asked, "How lonely do you feel right now" using an 11-point scale from 0 (*not at all*) to 10 (*extremely*). This single-item was used in previous EMA studies that assessed loneliness in the context of disordered eating (Paganini et al., 2018).

Body Dissatisfaction. Participants were asked, "How satisfied are you with your appearance right now?", on an 11-point scale from 0 (*completely dissatisfied*) to 10 (*completely satisfied*), with responses reverse-scored so that higher scores indicated greater body dissatisfaction. This single-item was adapted from previous EMA studies that investigated body dissatisfaction (Chia et al., 2018; Fuller-Tyszkiewicz et al., 2020; Portingale et al., 2022; Rogers et al., 2017).

Disordered Eating Urges. Participants were asked to indicate whether they had experienced the urge to engage in any of the following disordered eating behaviours since the previous survey. This included

Table 1
Demographic characteristics of the total sample and by FDA user status.

Demographic variable	FDA user status			Statistics	
	Non-user (n = 245, 50.7%)	User (n = 238, 49.3%)	Total (N = 483)	t/χ^2	p
Age ($M \pm SD$)	20.57 ± 6.07	20.44 ± 4.31	20.50 ± 5.27	0.27	.785
BMI ($M \pm SD$)	22.24 ± 4.20	22.17 ± 4.13	22.20 ± 4.16	0.18	.856
Gender (n, %)				1.99	.368
Female	199 (81.2)	181 (76.1)	380 (78.7)		
Male	43 (17.6)	54 (22.7)	97 (20.1)		
Other	3 (1.2)	5 (1.3)	6 (1.2)		
Cultural background (n, %)				13.10	**.004**
Caucasian	111 (45.3)	74 (31.1)	185 (38.3)		
Eastern Asian	43 (17.6)	67 (28.2)	110 (22.8)		
Southern Asian/ Southeast Asian	60 (24.5)	68 (28.6)	128 (26.5)		
Other	31 (12.7)	29 (12.2)	60 (12.4)		
Highest education completed (n, %)				4.08	.253
Year 12 or below	192 (78.4)	178 (74.8)	370 (76.7)		
Certificate/ diploma	10 (4.1)	20 (8.4)	30 (6.3)		
Bachelor's degree	31 (12.7)	27 (11.3)	58 (12.0)		
Postgraduate degree	12 (4.9)	13 (5.5)	25 (5.2)		
Primary language (n, %)				10.69	**.001**
English	174 (71.0)	134 (56.3)	308 (63.8)		
Other	71 (29.0)	104 (43.7)	175 (36.2)		
Sexual orientation (n, %)				3.86	.569
Heterosexual	192 (78.4)	183 (76.9)	375 (77.6)		
Lesbian/Gay	7 (2.9)	12 (5.0)	19 (3.9)		
Bisexual	30 (12.2)	33 (13.9)	63 (13.1)		
Asexual	4 (1.6)	1 (0.4)	5 (1.0)		
Other	6 (2.4)	4 (1.7)	10 (2.1)		
Prefer not to say	6 (2.4)	5 (2.1)	11 (2.3)		
Marital status (n, %)				5.86	.569
Single	170 (69.4)	154 (64.7)	324 (67.1)		
Married	10 (4.1)	5 (2.1)	15 (3.1)		
De facto	1 (0.4)	3 (1.3)	4 (0.8)		
Divorced	1 (0.4)	0 (0.0)	1 (0.2)		
In a relationship	63 (25.7)	76 (31.9)	139 (28.8)		
Eating disorder risk (n, %)					.738
At risk[a]	56 (22.9)	55 (23.1)	111 (23.0)		
Not at risk[b]	189 (77.1)	183 (76.9)	372 (77.0)		
Eating disorder diagnosed[c] (n, %)				0.07	.789
Yes	15 (6.1)	17 (7.1)	32 (6.6)		

Note. N = 483. Significant p values bolded. BMI = Body Mass Index (kg/m^2). M = mean, SD = standard deviation. t-test for continuous variables, chi-squared test for categorical variables. [a] EAT-26 scores at or above 20; [b] EAT-26 scores below 20; [c] lifetime diagnosis.

(a) "Urge to eat a large amount of food relative to what others would eat in the same situation/time" (overeating); and (b) "Urge to consciously restrict food intake to control weight/shape" (restrictive eating). Previous studies have used similar items to assess disordered eating behaviours (Engelberg et al., 2005; Fitzsimmons-Craft et al., 2016).

2.3. Procedure

The current experiment consisted of two phases. In Phase 1, participants were directed to the Qualtrics online survey platform. Those who consented completed a baseline questionnaire (approximately 30 min) collecting demographic and trait-level information. Participants were then emailed instructions to download the custom-built EMA-based smartphone application SEMA3 (Koval et al., 2019). Each participant also received a unique numeric code, randomly generated by SEMA3, which enabled the linking of Phase 1 and 2 data. Phase 2 was designed to commence the morning after Phase 1 completion. SEMA3 distributed six short (approximately 1–2-min) surveys per day at semi-random intervals between 10.30 a.m. and 9.30 p.m, across 7 days (maximum 42 surveys). These surveys assessed loneliness, mood, body dissatisfaction, and disordered eating urges. Participants had 30 min to complete each survey, after which, it expired and the data point was coded as missing. Participants were informed that their compliance would be monitored and those with <50% compliance were emailed reminders (maximum of two) to complete more surveys. The stratified random schedule balanced considerations of participant compliance and accuracy in capturing daily behaviours (Shiffman et al., 2008); consistent with recent EMA studies in the ED field (Chia et al., 2018; Drutschinin et al., 2018). Upon completion of the study, Research Experience Program participants were provided with course credit, whilst community participants were entered into a draw to win one of five $100 (AUD) e-gift cards.

2.4. Data analytic strategy

2.4.1. Preliminary analyses

All analyses were undertaken using R studio version 4.0.2 (RStudio R Core Team, 2020). The distribution of all Level-1 (i.e., state-based) continuous outcomes and predictors (i.e., loneliness, negative mood, and body dissatisfaction) were tested for normality through skewness and kurtosis. Data normality was confirmed with values between −2 and 2 for skewness and between −7 and 7 for kurtosis (Hair et al., 2010; see Table 1 of Supplementary Material for full results).

Numerous preliminary tests were undertaken to assess potential bias in the EMA data. First, baseline demographic and trait-level variables were correlated with compliance rates (i.e., the proportion of surveys completed per participant during Phase 2) to delineate systematic differences in completion (Shiffman et al., 2008). Second, to examine time and reactivity effects, all outcome variables (i.e., body dissatisfaction and disordered eating urges) were regressed onto three time-related predictors, namely, time of day (coded in hourly blocks), day of the week (weekday vs. weekend), and order of assessment (i.e., from the first to the last survey over the 7-days). When significant, these predictors were included as covariates in the relevant models during the main analyses. Full results from these reactivity and time effects tests are presented as a supplementary file.

2.4.2. Main analyses

Multilevel modelling analyses were conducted to test study hypotheses. A linear mixed model was used for the continuous Level 1 outcome (i.e., body dissatisfaction) and a generalized linear mixed model for dichotomous Level 1 outcomes (i.e., disordered eating urges). A bottom-up approach for analysis was adopted by gradually increasing model complexity. First, null models comprising only Level 1 outcomes (i.e., body dissatisfaction and disordered eating urges) were tested for between-person differences. The multilevel modelling approach was justified when significant variance (i.e., intraclass correlations) was observed between individuals. Second, for each Level 1 outcome, the Level 2 (i.e., trait-based) predictor (i.e., current FDA use) and Level 1 predictors (i.e., negative mood and loneliness) were entered into a singular model to assess the strength of fixed effects. As H3 and H4 examined within-group effects, they were limited to the FDA user sample (n = 238). Third, FDA use was modelled as random effects (within the FDA user group), to assess whether the strength of the relationships varied between individuals. Finally, the frequency of FDA use was included as a moderator for relationships in H3 with significant random effects.

As the EMA items for the Level 1 predictors (i.e., negative mood and loneliness) and the Level 1 outcome body dissatisfaction referred to the current moment, scores on the predictors were lagged (t – 1) to ensure that predictor data reflected time preceding outcome data; consistent with approaches in prior EMA studies (Fuller-Tyszkiewicz et al., 2019). However, as the EMA item assessing the Level 1 outcome disordered eating urges referred to the time interval between the current and previous survey, scores on the predictors at the previous time point (t - 1) were regressed onto disordered eating outcomes at the previous time point (t - 1). Additionally, scores on each outcome (i.e., body dissatisfaction and disordered eating) at the previous time-point were group-mean centred and included as covariates to ensure that the hypothesised predictor variable was predicting *change* in the outcomes. Lag time was included as a covariate to account for differences in time intervals between surveys. Models assessing the Level 2 predictor FDA usage examined average levels of EMA-assessed body dissatisfaction and disordered eating (rather than state-level *changes* in these outcomes). Hence, trait-level body image concern and eating pathology were included as covariates in the relevant models to ensure that average EMA-assessed levels of these outcomes differed from baseline. Given the substantiated effect of age (Rajagopalan, Bhattacharya, Peebles, Dakanalis, & Timko, 2019, October), BMI (Davison et al., 2003), and gender (Murray et al., 2017; Striegel-Moore et al., 2009) on body dissatisfaction and disordered eating psychopathology, these variables were included as covariates in all main analyses.

2.4.3. Power analyses

The *powerlmm* package (Magnusson, 2021) in R was used to simulate estimates of power for a multilevel model and suggested that the final sample of 483 participants was sufficient to detect small effects (>5% variance explained) with >0.80 power (alpha = .05) under the following plausible assumptions: (1) intraclass correlations ranging from 0.4 to 0.7, (2) average cluster size of 25–34 reflecting EMA compliance rates of ~60%–~80%, and (3) small variance in random slope for modelled Level 1 effects. Such effects are consistent with findings from prior body image-focused EMA studies (e.g., Fuller-Tyszkiewicz et al., 2018; Liu et al., 2022; Yee et al., 2020).

3. Results

Across the sample, almost half (49.3%) reported current FDA usage, whilst the remainder reported non-usage (51.7%; see Table 1). Current FDA users and non-users differed significantly in terms of cultural background and primary language, whereby the latter were more likely to be Caucasian with English as their primary language. Hence, these variables were included as covariates in the main analyses assessing FDA use.

3.1. Descriptive statistics

Descriptive statistics for Level 1 predictors and outcome variables and the Level 2 moderator are displayed in Table 2. Among FDA users, the most commonly used FDA was UberEats (92.9%), followed by Deliveroo (40.3%), Menulog (31.1%), DoorDash (21.9%), and Foodora (2.9%). The majority (59.2%) of FDA users reported COVID-19 changes to usage, with more reporting an increase (33.1%) than a decrease in

Table 2
Descriptive statistics of Level-1 and Level-2 variables with means, standard deviations, ranges, and intraclass correlation coefficients.

Variable	FDA user status				Range
	User (n = 238)	Non-user (n = 245)	Total (N = 483)		
	$M \pm SD$	$M \pm SD$	$M \pm SD$	ICC	
Level-1					
Body dissatisfaction	5.23 ± 2.15	4.83 ± 2.41	5.03 ± 2.20	.57	0–10
Urge for restrictive eating (n, %)	74 (31.1)	63 (25.7)	137 (28.4)	.44	0–1
Urge for overeating (n, %)	17 (7.1)	18 (7.3)	35 (7.2)	.25	0–1
Negative mood	4.34 ± 2.07	4.11 ± 2.22	4.20 ± 2.16	n/a	0–10
Loneliness	3.20 ± 2.66	2.82 ± 2.60	2.92 ± 2.62	n/a	0–10
Level-2					
FDA use frequency	1.95 ± 1.02	n/a	n/a	n/a	1–5

Note. $N = 483$. M = mean, SD = standard deviation, n/a = not applicable, ICC = the proportion of total variance attributable to between-person variation. % = proportion of "yes" responses. Level-1 variables are state measures, whereas Level-2 variables are trait measures.

usage (26.1%). Restrictive eating urges were more commonly reported than the urge to overeat.

3.2. Preliminary analyses

The average number of EMA surveys completed by participants in the final sample was 33.19 ($SD = 5.75$) out of 42 possible assessments (78.6%). Compliance rates for EMA surveys were not significantly associated with the baseline variables of FDA use ($t = -0.01$, $p = .991$), FDA use frequency ($F = 0.07$, $p = .782$), BMI ($r = -0.001$, $p = .990$), primary language ($t = -1.62$, $p = .105$), cultural background ($F = 0.65$, $p = .718$), marital status ($F = 2.16$, $p = .144$), sexual orientation ($F = 0.32$, $p = .574$), educational attainment ($F = 0.08$, $p = .784$), or lifetime ED diagnosis ($t = 0.73$, $p = .469$). However, compliance was significantly related to age ($r = 0.10$, $p = .030$) and ED risk (a score ≥20 on the EAT-26; $t = -8.39$, $p < .001$), and hence, these two variables (age and ED risk) were also included as a covariate in all main analyses.

3.3. Main analyses

3.3.1. Current FDA use, loneliness, and negative mood predicting body dissatisfaction and disordered eating urges (H1-2)

As shown in Table 3, across the entire sample ($N = 438$), current FDA use at baseline, relative to non-use, predicted greater EMA-assessed urges for overeating. Moreover, state experiences of loneliness and negative mood predicted greater state body dissatisfaction throughout daily life; with negative mood further predicting greater state urges for restrictive eating and overeating. However, all effects were small in magnitude.

3.3.2. Loneliness and negative mood predicting body dissatisfaction and disordered eating urges among current FDA users (H3)

As displayed in Table 4, among current FDA users ($n = 238$), state loneliness and negative mood predicted greater state body dissatisfaction, and state negative mood further predicted greater state urges for overeating. However, again, all effects were small.[1]

3.3.3. Moderating effects of FDA use frequency on the relationship between loneliness and negative mood predicting body dissatisfaction among current FDA users (H4)

Whilst significant inter-individual variation was observed for the state-level relationships between loneliness and negative mood predicting body dissatisfaction (see Table 4), FDA use frequency failed to moderate these effects (see Table 5). Moreover, there was no main effect for FDA use frequency predicting state body dissatisfaction.

4. Discussion

The primary aims of the current study were to investigate FDA use in relation to body dissatisfaction and disordered eating urges, and examine loneliness and negative mood as they relate, naturalistically and in real-time, to body dissatisfaction and disordered eating urges among a sample of community participants. Our secondary aim was to investigate whether the frequency of FDA usage impacted these latter relationships. We hypothesised that (H1) current FDA use; (H2a) loneliness; and (H2b) negative mood would be related to greater body dissatisfaction and disordered eating urges throughout daily life. We further hypothesised that among current FDA users, (H3a) loneliness; and (H3b) negative mood would be related to greater body dissatisfaction and disordered eating urges in daily life; and that (H4) the frequency of FDA use would moderate their relationships. The first three hypotheses were partially supported. Across the entire sample, current FDA use predicted greater EMA-assessed urges to engage in overeating. Additionally, experiences of state loneliness and negative mood predicted greater state body dissatisfaction, and state negative mood further predicted greater urges for restrictive eating and overeating throughout daily life. The analyses also revealed that among FDA users, experiences of state loneliness and negative mood predicted the same outcomes as those when examined across the entire sample, with one exception; negative mood failed to predict urges for restrictive eating. Lastly, contrary to H4, there was no support for the moderating effect of FDA use frequency.

4.1. The effects of food delivery app use on disordered eating urges and body dissatisfaction

As hypothesised (H1), current FDA users were more likely to experience EMA-assessed urges to engage in overeating, than non-users. Although no empirical research within the ED field to date has examined the impact of FDAs, the current findings align with our theorised notion that FDA use may foster excessive and dysregulated eating behaviours and cognitions. That is because FDAs represent a food-rich environment where highly palatable and hedonic choices are abundantly promoted, available, and accessible. However, the observed effects were small, and therefore, should be interpreted with caution.

Contrary to expectations (H1), current FDA use, relative to non-use, failed to predict one's urge to consciously restrict food intake, and negative subjective evaluations of one's body weight and shape (i.e., body dissatisfaction). One possible explanation for the null effect on restrictive eating urges is that the disordered eating symptoms fostered by FDA use are more emotionally-induced or driven by the pursuit of hedonic rewards—i.e., defining features of overeating and binge-eating (Wierenga et al., 2014) than resultant from common antecedents to

[1] For context, we also assessed the effects of FDA use on state loneliness and negative mood among current FDA users. However, no significant effect was observed for state loneliness, $b = 0.02$, 95% CI [-0.31–0.36], $se = 0.17$, $p = .897$, or state negative mood, $b = 0.21$, 95% CI [-0.78–0.51], $se = 0.15$, $p = .154$.

Table 3
Fixed effects for FDA use, loneliness, and negative mood predicting body dissatisfaction and disordered eating urges.

Predictors	Body dissatisfaction			Urge for restrictive eating			Urge for overeating		
	b (95% CIs)	*se*	*p*	*b* (95% CIs)	*se*	*p*	*b* (95% CIs)	*se*	*p*
FDA use	0.19 (−0.10–0.47)	0.15	.210	0.03 (−0.44–0.50)	0.24	.908	0.51 (0.03–0.99)	0.25	**.039**
Loneliness	0.03 (0.01–0.04)	0.01	**.001**	0.03 (−0.01–0.07)	0.02	.094	0.02 (−0.03–0.07)	0.02	.405
Negative mood	0.08 (0.06–0.09	0.01	**<.001**	0.05 (0.003–0.09)	0.02	**.035**	0.06 (0.01–0.12)	0.03	**.022**

Note. $N = 483$. *b* = unstandardized coefficients, CI = confidence interval, *se* = standard error. Significant *p* values are bolded. Covariates omitted from the table for simplicity (information available from the corresponding author upon request).

Table 4
Fixed and random effects for loneliness and negative mood predicting body dissatisfaction and disordered eating urges within FDA user group.

Predictors	Body dissatisfaction				Urge for restrictive eating				Urge for overeating			
Fixed effects	*b* (95% CIs)	*se*	*p*		*b* (95% CIs)	*se*	*p*		*b* (95% CIs)	*se*	*p*	
Loneliness	0.02 (0.001–0.05)	0.01	**.034**		−0.01 (−0.07–0.04)	0.03	.672		0.05 (−0.02–0.11)	0.03	.150	
Negative mood	0.07 (0.05–0.10)	0.01	**<.001**		0.02 (−0.04–0.08)	0.03	.547		0.12 (0.04–0.20)	0.04	**.002**	
Random effects	Variance component	*SD*	*χ2*	*p*	Variance component	*SD*	*χ2*	*p*	Variance component	*SD*	*χ2*	*p*
Loneliness	0.007	0.08	10.79	**.005**	0.002	0.05	0.74	.689	0.028	0.17	3.07	.215
Negative mood	0.020	0.14	51.1	**<.001**	0.001	0.03	0.16	.922	0.028	0.19	3.07	.215

Note. $n = 238$. *b* = unstandardized coefficients, CI = confidence interval. Significant *p* values are bolded. Covariates omitted from the table for simplicity (information available from the corresponding author upon request).

Table 5
Moderating effects of FDA use frequency for the relationship of loneliness and negative mood predicting body dissatisfaction within FDA user group.

Predictors	Body dissatisfaction		
	b (95% CIs)	*se*	*p*
Hypothesis 4a			
Loneliness	0.04 (−0.01–0.09)	0.03	.137
FDA use frequency	0.20 (−0.03–0.44)	0.12	.093
Loneliness x FDA use frequency	−0.01 (−0.03–0.01)	0.01	.419
Hypothesis 4b			
Negative mood	0.08 (0.01–0.14)	0.03	**.025**
FDA use frequency	0.20 (−0.03–0.43)	0.12	.097
Negative mood x FDA use frequency	−0.01(-0.04–0.02)	0.02	.701

Note. $N = 238$, *b* = unstandardized coefficients, CI = confidence interval, *se* = standard error. Significant *p* values are bolded. Covariates omitted from the table for simplicity (information available from the corresponding author upon request).

restrictive eating. These may include restraint goals (i.e., cognitive representation of the desired endpoint; e.g., 'I want to look slim') or social motivations (i.e., perceived public pressure to restrict food intake; e.g., perception of scarcity of food resources; Bublitz et al., 2010).

One potential reason for the null effect on body dissatisfaction is that FDA use may not have been strong enough to induce changes in body dissatisfaction in a community-based sample. Considering that individuals with EDs may be more inclined to exhibit negative cognitive biases regarding their body weight and shape, we anticipate that the relationship between FDA use and body dissatisfaction may exist in a clinical ED sample. It is also worth noting that, in the current study, the observed effect of FDA use on urges for overeating, but not body dissatisfaction or restrictive eating, aligns from a conceptual perspective. That is, whilst overeating is often characterised by the evasion or avoidance of overvaluation of body shape and weight (Dunkley & Grilo, 2007), restrictive eating is often undertaken to directly address body dissatisfaction to control one's shape or weight (Fitzsimmons-Craft et al., 2016; Johnson et al., 2012). Hence, providing support for the effect of FDA use on urges for overeating without the antecedent of body dissatisfaction. Future EMA research, with a more nuanced assessment of disordered eating constructs, is needed to test whether the present findings replicate in clinical ED samples.

4.2. The effects of loneliness and negative mood on disordered eating urges and body dissatisfaction

As hypothesised (H2a; H3a), across both the entire sample and subset of FDA users when examined independently, state loneliness predicted greater state body dissatisfaction throughout daily life. Although the effects were small and should be interpreted with caution, this finding is novel, given that the existing, small body of literature (e.g., Harney et al., 2014; Mason et al., 2016; Richardson et al., 2017; Southward et al., 2014) has predominately focused on loneliness (or the indirect measure of perceived social isolation) within the context of eating pathology, due to links between interpersonal dysfunction and binge-eating outlined in the interpersonal model (Wilfey et al., 2000). Few studies have considered the directional relationship between loneliness and body dissatisfaction specifically, though some cross-sectional studies have supported a link between these constructs (Barnett et al., 2020, p. 104088; Zinovyeva et al., 2016). Drawing from the interpersonal model (Wilfey et al., 2000), the present findings support the notion that loneliness could precipitate low self-esteem, or in the current study, negative body evaluation.

Consistent with predictions (H2b; H3b), state negative mood was also prospectively related to greater levels of state body dissatisfaction, as well as urges for restrictive eating and overeating throughout daily life among the entire sample and restricting eating urges among FDA users when examined independently. Although effects were small and should be interpreted tentatively, the current findings replicate previous EMA studies whereby momentary elevations in negative affect were found to predict disordered eating symptoms (Ambwani et al., 2015; Berg et al., 2013; Mason et al., 2016) and body dissatisfaction (Srivastava et al., 2021). These findings also align with the interpersonal model's (Wilfey et al., 2000) notion that negative mood may foster negative self-evaluation and subsequently, disordered eating in an attempt to mitigate emotional distress.

Notably, loneliness was not significantly related to the disordered eating urge outcomes. This suggests that the aforementioned effects of daily experiences of loneliness on state body dissatisfaction do not necessarily translate into maladaptive eating behaviours. The few previous studies that documented significant effects of loneliness on disordered eating-related outcomes were conducted predominantly with individuals already exhibiting eating pathology (Harney et al., 2014; Richardson et al., 2017; Southward et al., 2014). Given that the current

sample largely comprised of individuals who were at a low ED risk (i.e., 77.0% presented with an EAT-26 score <20; Garner et al., 1982), and self-reported as not having a lifetime ED diagnosis (93.4%), one possible explanation for the null findings is that momentary experiences of loneliness may not have been strong enough to trigger urges to engage in maladaptive coping behaviours (i.e., disordered eating) in the current community-based sample. Alternatively, it is plausible that individuals without eating pathology do not turn to food to alleviate feelings of loneliness. Future research should examine these two possible explanations in a clinical ED sample comprising distinct ED subtypes (e.g., anorexia nervosa, bulimia nervosa, etc.).

4.3. The non-moderating effect of food delivery app use frequency

Contrary to predictions (H4), among current FDA users, the frequency of FDA use did not significantly moderate the relationships between loneliness and negative mood with body dissatisfaction. This suggests that individuals who currently use FDAs do not necessarily turn to these apps more or less frequently to influence bodily self-evaluation following experiences of loneliness and negative mood. That is, to self-soothe and hence, distract from negative bodily-self appraisals.

Alternatively, the body image implications of FDA use may be relevant for some, but not all, individuals. Although populations with excess weight experience a greater risk for body dissatisfaction (Fairburn et al., 1998; Weinberger et al., 2016), the BMI range for the current sample was narrow and within the healthy range. Thus, body image implications may have been less common for this sample; reducing the ability to detect an effect. Future EMA research should seek to assess the effect of FDA usage on body dissatisfaction and disordered eating urges, and the potential moderating effect of FDA usage frequency, among different BMI groups (e.g., a targeted overweight/obese sample compared to healthy-weight controls).

4.4. Implications

The present findings extend prominent ED theories (e.g., the interpersonal model of binge-eating; Wilfey et al., 2000) to a state level by demonstrating the effects of momentary experiences of loneliness and negative mood on body dissatisfaction, and the additional impact of negative mood on disordered eating symptoms. These findings are also important to consider within the current context of the pandemic. Research has documented positive associations between COVID-19 and loneliness and negative mood (Loades et al., 2020); with subsequent negative implications for body image and eating disturbance (Vuillier et al., 2021). However, such research is scant and predominately cross-sectional. Providing a novel contribution, our findings suggest that strategies to contain and limit the pandemic, such as social distancing measures and stay-at-home orders (Rodgers et al., 2020), should be treated with caution due to the potentially detrimental effects of loneliness and negative mood. On the other hand, the null effect of loneliness on disordered eating outcomes suggests that this experience may not be directly related to disordered eating urges in a community-based sample.

More importantly, the current study offers novel insights into the influence of FDA usage, contributing to a neglected area within the ED literature. Current FDA use was found to predict greater urges to engage in overeating. These findings are also important to consider within the context of the pandemic and accompanying social restrictions which have substantial consequences on food purchasing and eating behaviours (Vuillier et al., 2021). Specifically, recommendations to limit activities such as grocery shopping and perceptions of a scarcity of certain food products during COVID-19, combined with the convenient and immediate consumption of food that is enabled by FDAs (Bates et al., 2020; Martino et al., 2021), may encourage individuals to purchase and consume more food than usual via these services (Rodgers et al., 2020). Thus, potentially leading to or exacerbating difficulties regulating food intake (i.e., overeating).

On the other hand, the null effects regarding body dissatisfaction and restrictive eating urge suggest that the impact of these services—at least during the pandemic, or perhaps more broadly—may be limited to emotionally-induced overeating. That is, rather than disordered eating driven by restraint goals or social motivations to restrict food intake, and without a direct effect on one's bodily-self-evaluation. These findings may be explained by evidence that restrictive eating requires significant cognitive and attentional resources. Therefore, cognitively taxing situations, which distract from, or deplete one's resources to maintain, restrictive eating goals are likely to increase food consumption (Bublitz et al., 2010; Ward & Mann, 2000). Given the cognitively taxing nature of the evolving pandemic, and the immediate temptation to consume food that is provided by FDAs, it is plausible that FDA use within this context increased overeating but not restrained eating tendencies.

Insofar as future research can replicate the current findings, at a practical level, they may inform preventative and early intervention strategies targeted toward EDs and disordered eating; particularly, among young women who are university students (the predominant group in the current sample). Given that FDA use predicted urges to engage in overeating—a well-established and robust risk factor for clinically significant ED symptoms (Masheb & Grilo, 2006; Wierenga et al., 2014)—which is often emotionally induced, programs aimed at helping students regulate difficult emotions and develop adaptive coping strategies, may bolster against the maladaptive use of FDAs. Our findings may also inform the development of contemporary media literacy programmes that seek to educate young people about the potentially harmful effects of FDA-related marketing during the pandemic (or perhaps, more broadly) on eating behaviours and emotional well-being. For instance, marketing campaigns promoting these services as an "isolation activity" may foster the maladaptive use of FDAs to combat loneliness and cope with difficult emotions. Instead, these programmes should seek to encourage more informed, healthful use of FDAs, thereby, potentially helping young people maintain their emotional well-being whilst reducing their risk of eating pathology.

4.5. Limitations and future directions

Several limitations need to be addressed. First, the measurement decision to assess FDA use at baseline meant that this study was unable to establish whether the act of using FDAs preceded in-the-moment *changes* in levels of disordered eating urges and body dissatisfaction throughout daily life. Future EMA studies should seek to operationalise this variable at the state level to capture momentary instances of FDA use. Future research may also consider incorporating more detailed assessment items for other salient factors related to FDA use, such as the type and quantity of food purchased and consumed, social context (e.g., whether the food was ordered and/or consumed in isolation or as a shared activity), and the specific apps used (e.g., UberEats, Deliveroo etc.).

Second, given the paucity of FDA-related research, we mirrored the criterion used in social network app-related research to separate users (i.e., > once a month) from non-users. Due to substantial differences in these two types of behaviour, however, this may not be sufficient justification. Nonetheless, it is difficult to find an appropriate cut-point. We attempted to balance usage frequency against the consideration of whether those who used FDAs less were still worth exploring. Weekly usage seemed too stringent as a cut-point for current usage and would have meant that 63% of the sample was excluded. Comparatively, including all individuals (or those with very low engagement levels, e.g., *once a month*), and thus, those who used FDAs in a one-off manner would not align with our intended exploration of associations between some form of repeated use and the state-based outcomes.

Third, although assessing disordered eating urges as a proxy for actual disordered eating behaviours allowed for a broader collection of data within the current community-based sample, the conscious urge to engage in disordered eating does not necessarily always precede the

actual disordered eating behaviour. Therefore, the current operationalisation may have produced a less precise estimate of the true effect (i.e., fewer reported urges). Future studies could consider assessing the actual quantity of food consumed or multiple behavioural items to assess for the presence, severity, and frequency of the disordered eating variables assessed. Collecting data on hunger levels would also be worthwhile.

Fourth, the specific context in which the study was conducted (i.e., during the COVID-19 pandemic) was not accounted for in the analysis. This may reduce the generalisability of our findings to broader contexts. Whilst beyond the scope of the current study, given the dynamic nature of COVID-19 and accompanying social restrictions, future EMA research should seek to examine the hypothesised relationships within the context of the pandemic; whilst accounting for important factors (e.g., differing severity/duration of lockdown stages across various Australian states/cities) during analysis. Future research could also consider comparing data across participants who reported during the strict lockdown periods versus other periods. Such research undertaking may highlight specific contextual factors heightening ED-related risk.

Lastly, as the initial purpose of the broader study was to explore body image experiences in women, trait body image concern was captured via the Body Shape Questionnaire (Cooper et al., 1987); a measure designed for women, not men (20.1% of the current sample), that is not invariant across genders (da Silva et al., 2019) Although the results of the main analyses including this covariate did not reach statistical significance, this limitation should be kept in mind when interpreting current findings. Other trait factors were also not examined as potential moderators, but may be an avenue for further research. For instance, the desire for instant gratification is a risk factor for binge eating (Steward et al., 2017). Given that FDAs present an opportunity to obtain immediate rewards, individuals higher on this trait may experience greater ED-related risk following FDA use.

5. Conclusion

The present study was the first, to date, to use EMA to investigate the influence of FDA use, loneliness, and negative mood on a range of ED-related outcomes (i.e., body dissatisfaction and disordered eating urges). The present findings suggest that FDA use may predict maladaptive eating behaviours, namely, greater urges for overeating in daily life. The current results also extend the literature by corroborating the effects of negative mood on body dissatisfaction and disordered eating urges at the state level and provide novel insights into the potential influence of momentary experiences of loneliness. However, the present findings also suggest that the effects of FDA use on related outcomes (i.e., restrictive eating and body dissatisfaction) and state loneliness on disordered eating urges, are limited in a community-based sample. Nonetheless, the current study provides promising evidence for the notion that FDA usage may reflect a behavioural response to interpersonal difficulties and associated difficult emotions that may ultimately trigger maladaptive eating behaviours. Furthermore, our study highlights that loneliness and negative mood could activate a dysfunctional system of self-evaluation that may ultimately trigger maladaptive eating behaviours; thus, warranting further exploration. Future EMA studies may consider a more nuanced examination of the hypothesised mechanisms (e.g., daily instances of FDA usage, loneliness, and negative mood) as they relate to body dissatisfaction and disordered eating throughout daily life in a clinical ED sample. As FDA use continues to proliferate, enhancing our understanding of the mechanisms by which these platforms may be harmful remains a salient area of research, and may help to inform ED prevention and early intervention strategies.

Compliance with ethical standards

This study was performed in line with the principles of the Declaration of Helsinki.

Ethical approval

Approval was granted by the Behavioural and Social Science Human Ethics Sub-Committee of the University of Melbourne (Date: December 5, 2014; ID: 1441553).

Funding

No funding was received for conducting this study.

Consent

Informed consent was obtained from all individual participants included in the study.

Data code and availability

The data is available upon request.

CRediT author statement

Jade Portingale: Conceptualization, Methodology, Formal analyses, Investigation, Data Curation, Writing- Original Draft. **Sarah Eddy**: Methodology, Formal analyses, Investigation, Data Curation, Writing-Review & Editing. **Matthew Fuller-Tyszkiewicz**: Software, Formal analyses, Validation, Writing-Review & Editing. **Shanshan Liu**: Investigation, Data Curation, Writing- Review & Editing. **Sarah Giles**: Investigation, Data Curation, Writing- Review & Editing. **Isabel Krug**: Conceptualization, Methodology, Writing- Review & Editing, Supervision, Project administration.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2022.106310.

References

Al Amin, M., Arefin, M. S., Alam, M. R., Ahammad, T., & Hoque, M. R. (2021). Using mobile food delivery applications during COVID-19 pandemic: An extended model of planned behavior. *Journal of Food Products Marketing, 27*(2), 105–126. https://doi.org/10.1080/10454446.2021.1906817

Ambwani, S., Roche, M. J., Minnick, A. M., & Pincus, A. L. (2015). Negative affect, interpersonal perception, and binge eating behavior: An experience sampling study. *International Journal of Eating Disorders, 48*(6), 715–726. https://doi.org/10.1002/eat.22410

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Ansell, E. B., Grilo, C. M., & White, M. A. (2012). Examining the interpersonal model of binge eating and loss of control over eating in women. *International Journal of Eating Disorders, 45*(1), 43–50. https://doi.org/10.1002/eat.20897

Banerjee, D., & Rai, M. (2020). Social isolation in Covid-19: The impact of loneliness. *International Journal of Social Psychiatry, 66*(6), 525–527. https://doi.org/10.1177/0020764020922269

Barnett, M. D., Moore, J. M., & Edzards, S. M. (2020). *Body image satisfaction and loneliness among young adult and older adult age cohorts*. Archives of Gerontology and Geriatrics. https://doi.org/10.1016/j.archger.2020.104088

Bates, S., Reeve, B., & Trevena, H. (2020). A narrative review of online food delivery in Australia: Challenges and opportunities for public health nutrition policy. *Public Health Nutrition, 1–11*. https://doi.org/10.1017/S1368980020000701

Belarmino, A., Raab, C., Tang, J., & Han, W. (2021). Exploring the motivations to use online meal delivery platforms: Before and during quarantine. *International Journal of Hospitality Management, 96*, Article 102983. https://doi.org/10.1016/j.ijhm.2021.102983

Berg, K. C., Crosby, R. D., Cao, L., Peterson, C. B., Engel, S. G., Mitchell, J. E., & Wonderlich, S. A. (2013). Facets of negative affect prior to and following binge-only, purge-only, and binge/purge events in women with bulimia nervosa. *Journal of Abnormal Psychology, 122*(1), 111. https://doi.org/10.1037/a0029703

Bublitz, M. G., Peracchio, L. A., & Block, L. G. (2010). Why did I eat that? Perspectives on food decision making and dietary restraint. *Journal of Consumer Psychology, 20*(3), 239–258. https://doi.org/10.1016/j.jcps.2010.06.008

Chia, J. L. P., Fuller-Tyszkiewicz, M., Buck, K., Chamari, K., Richardson, B., & Krug, I. (2018). An ecological momentary assessment of the effect of fasting during Ramadan on disordered eating behaviors. *Appetite, 127*, 44–51. https://doi.org/10.1016/j.appet.2018.04.017

Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairbum, C. G. (1987). The development and validation of the body shape questionnaire. *International Journal of Eating Disorders, 6*(4), 485–494. https://doi.org/10.1002/1098-108X(198707)6:4<485::AID-EAT2260060405>3.0.CO;2-O.

Cortese, S., Comencini, E., Vincenzi, B., Speranza, M., & Angriman, M. (2013). Attention-deficit/hyperactivity disorder and impairment in executive functions: A barrier to weight loss in individuals with obesity? *BMC Psychiatry, 13*(1), 1–7. https://doi.org/10.1186/1471-244X-13-286

Dana, L. M., Hart, E., McAleese, A., Bastable, A., & Pettigrew, S. (2021). Factors associated with ordering food via online meal ordering services. *Public Health Nutrition, 24*(17), 5704–5709. https://doi.org/10.1017/S1368980021001294

Davison, K. K., Markey, C. N., & Birch, L. L. (2003). A longitudinal examination of patterns in girls' weight concerns and body dissatisfaction from ages 5 to 9 years. *International Journal of Eating Disorders, 33*(3), 320–332. https://doi.org/10.1002/eat.10142

Davis, C., Patte, K., Levitan, R., Reid, C., Tweed, S., & Curtis, C. (2007). From motivation to behaviour: A model of reward sensitivity, overeating, and food preferences in the risk profile for obesity. *Appetite, 48*(1), 12–19. https://doi.org/10.1016/j.appet.2006.05.016

Drutschinin, K., Fuller-Tyszkiewicz, M., Paoli, T. D., Lewis, V., & Krug, I. (2018). The daily frequency, type, and effects of appearance comparisons on disordered eating. *Psychology of Women Quarterly, 42*(2), 151–161. https://doi.org/10.1177/0361684317732001

Dunkley, D. M., & Grilo, C. M. (2007). Self-criticism, low self-esteem, depressive symptoms, and over-evaluation of shape and weight in binge eating disorder patients. *Behaviour Research and Therapy, 45*(1), 139–149. https://doi.org/10.1016/j.brat.2006.01.017

Elliott, C. A., Tanofsky-Kraff, M., Shomaker, L. B., Columbo, K. M., Wolkoff, L. E., Ranzenhofer, L. M., & Yanovski, J. A. (2010). An examination of the interpersonal model of loss of control eating in children and adolescents. *Behaviour Research and Therapy, 48*(5), 424–428. https://doi.org/10.1016/j.brat.2009.12.012

Eneva, K. T., Murray, S., O'Garro-Moore, J., Yiu, A., Alloy, L. B., Avena, N. M., & Chen, E. Y. (2017). Reward and punishment sensitivity and disordered eating behaviors in men and women. *Journal of Eating Disorders, 5*(1), 1–6. https://doi.org/10.1186/s40337-017-0138-2

Engelberg, M. J., Gauvin, L., & Steiger, H. (2005). A naturalistic evaluation of the relation between dietary restraint, the urge to binge, and actual binge eating: A clarification. *International Journal of Eating Disorders, 38*(4), 355–360. https://doi.org/10.1002/eat.20186

Espel-Huynh, H. M., Muratore, A. F., & Lowe, M. R. (2018). A narrative review of the construct of hedonic hunger and its measurement by the Power of Food Scale. *Obesity Science & Practice, 4*(3), 238–249. https://doi.org/10.1002/osp4.161

Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: A "transdiagnostic" theory and treatment. *Behaviour Research and Therapy, 41*(5), 509–528. https://doi.org/10.1016/s0005-7967(02)00088-8

Fitzsimmons-Craft, E. E., Ciao, A. C., & Accurso, E. C. (2016). A naturalistic examination of social comparisons and disordered eating thoughts, urges, and behaviors in college women. *International Journal of Eating Disorders, 49*(2), 141–150. https://doi.org/10.1002/eat.22486

Fuller-Tyszkiewicz, M., Chhouk, J., McCann, L.-A., Urbina, G., Vuo, H., Krug, I., Ricciardelli, L., Linardon, J., Broadbent, J., & Heron, K. (2019). Appearance comparison and other appearance-related influences on body dissatisfaction in everyday life. *Body Image, 28*, 101–109. https://doi.org/10.1016/j.bodyim.2019.01.002

Fuller-Tyszkiewicz, M., Krug, I., Smyth, J. M., Fernandez-Aranda, F., Treasure, J., Linardon, J., Vasa, R., & Shatte, A. (2020). State-based markers of disordered eating symptom severity. *Journal of Clinical Medicine, 9*(6), 1948. https://doi.org/10.3390/jcm9061948

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. https://doi.org/10.1016/j.bodyim.2018.01.004

Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine, 12*(4), 871–878. https://doi.org/10.1017/s0033291700049163

Goldschmidt, A. B., Wonderlich, S. A., Crosby, R. D., Engel, S. G., Lavender, J. M., Peterson, C. B., Crow, S. J., Cao, L., & Mitchell, J. E. (2014). Ecological momentary assessment of stressful events and negative affect in bulimia nervosa. *Journal of Consulting and Clinical Psychology, 82*(1), 30. https://doi.org/10.1037/a0034974

Griffiths, S., & Stefanovski, A. (2019). Thinspiration and fitspiration in everyday life: An experience sampling study. *Body Image, 30*, 135–144. https://doi.org/10.1016/j.bodyim.2019.07.002

Haedt-Matt, A. A., & Keel, P. K. (2011). Revisiting the affect regulation model of binge eating: A meta-analysis of studies using ecological momentary assessment. *Psychological Bulletin, 137*(4), 660. https://doi.org/10.1037/a0023660

Hair, J. F. (2010). Black WC, Babin BJ; and Anderson RE (2010), Multivariate Data Analysis.

Harney, M. B., Fitzsimmons-Craft, E. E., Maldonado, C. R., & Bardone-Cone, A. M. (2014). Negative affective experiences in relation to stages of eating disorder recovery. *Eating Behaviors, 15*(1), 24–30. https://doi.org/10.1016/j.eatbeh.2013.10.016

Hart, L. M., Granillo, M. T., Jorm, A. F., & Paxton, S. J. (2011). Unmet need for treatment in the eating disorders: A systematic review of eating disorder specific treatment seeking among community cases. *Clinical Psychology Review, 31*(5), 727–735. https://doi.org/10.1016/j.cpr.2011.03.004

Hennegan, J. M., Loxton, N. J., & Mattar, A. (2013). Great expectations. Eating expectancies as mediators of reinforcement sensitivity and eating. *Appetite, 71*, 81–88. https://doi.org/10.1016/j.appet.2013.07.013

Ivanova, I. V., Tasca, G. A., Hammond, N., Balfour, L., Ritchie, K., Koszycki, D., & Bissada, H. (2015). Negative affect mediates the relationship between interpersonal problems and binge-eating disorder symptoms and psychopathology in a clinical sample: A test of the interpersonal model. *European Eating Disorders Review, 23*(2), 133–138. https://doi.org/10.1002/erv.2344

Ivanova, I. V., Tasca, G. A., Proulx, G., & Bissada, H. (2015). Does the interpersonal model apply across eating disorder diagnostic groups? A structural equation modeling approach. *Comprehensive Psychiatry, 63*, 80–87. https://doi.org/10.1016/j.comppsych.2015.08.009

Ivanova, I. V., Tasca, G. A., Proulx, G., & Bissasda, H. (2017). Contribution of interpersonal problems to eating disorder psychopathology via negative affect in treatment-seeking men and women: Testing the validity of the interpersonal model in an understudied population. *Clinical Psychology & Psychotherapy, 24*(4), 952–964. https://doi.org/10.1002/cpp.2060

Johnson, F., Pratt, M., & Wardle, J. (2012). Dietary restraint and self-regulation in eating behavior. *International Journal of Obesity, 36*(5), 665–674. https://doi.org/10.1038/ijo.2011.156

Karam, A. M., Eichen, D. M., Fitzsimmons-Craft, E. E., & Wilfley, D. E. (2020). An examination of the interpersonal model of binge eating over the course of treatment. *European Eating Disorders Review, 28*(1), 66–78. https://doi.org/10.1002/erv.2700

Kidd, C., & Loxton, N. J. (2018). Junk food advertising moderates the indirect effect of reward sensitivity and food consumption via the urge to eat. *Physiology & Behavior, 188*, 276–282. https://doi.org/10.1016/j.physbeh.2018.02.030

Killeen, C. (1998). Loneliness: An epidemic in modern society. *Journal of Advanced Nursing, 28*(4), 762–770. https://doi.org/10.1046/j.1365-2648.1998.00703.x

Klatzkin, R. R., Gaffney, S., Cyrus, K., Bigus, E., & Brownley, K. A. (2018). Stress-induced eating in women with binge-eating disorder and obesity. *Biological Psychology, 131*, 96–106. https://doi.org/10.1016/j.biopsycho.2016.11.002

Koval, P., Hinton, J., Dozo, N., Gleeson, J., Alvarez, M., Harrison, A., Vu, D., Susanto, R., Jayaputera, G., & Sinnott, R. (2019). SEMA3: Smartphone ecological momentary assessment (version 3) [Computer software]. http://www.sema3.com.

Levine, M. P. (2012). Loneliness and eating disorders. *Journal of Psychology, 146*(1–2), 243–257. https://doi.org/10.1080/00223980.2011.606435

Linardon, J., Messer, M., Rodgers, R. F., & Fuller-Tyszkiewicz, M. (2021). A systematic scoping review of research on COVID-19 impacts on eating disorders: A critical appraisal of the evidence and recommendations for the field. *International Journal of Eating Disorders*. https://doi.org/10.1002/eat.23640

Li, X., Tao, Q., Fang, Y., Cheng, C., Hao, Y., Qi, J., … Zhang, X. (2015). Reward sensitivity predicts ice cream-related attentional bias assessed by inattentional blindness. *Appetite, 89*, 258–264. https://doi.org/10.1016/j.appet. 2015.02.010

Liu, S., Fuller-Tyszkiewicz, M., Eddy, S., Liu, X., Portingale, J., Giles, S., & Krug, I. (2022). The effects of appearance-based comments and non-appearance-based evaluations on body dissatisfaction and disordered eating urges: An ecological momentary assessment study. *Behavior Therapy*. https://doi.org/10.1016/j.beth.2022.01.002

Lo Coco, G., Sutton, R., Tasca, G. A., Salerno, L., Oieni, V., & Compare, A. (2016). Does the interpersonal model generalize to obesity without binge eating? *European Eating Disorders Review, 24*(5), 391–398. https://doi.org/10.1002/erv.2459

Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., … Crawley, E. (2020). Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry, 59*(11), 1218–1239. https://doi.org/10.1016/j.jaac.2020.05.009

Lowe, M. R., & Butryn, M. L. (2007). Hedonic hunger: A new dimension of appetite? *Physiology & Behavior, 91*(4), 432–439. https://doi.org/10.1016/j.physbeh.2007.04.006

Magnusson, K. (2021). Powerlmm: Power analysis for longitudinal multilevel models. R package version 0.4.0.9000. https://github.com/rpsychologist/powerlmm.

Martino, F., Brooks, R., Browne, J., Carah, N., Zorbas, C., Corben, K., … Backholer, K. (2021). The nature and extent of online marketing by big food and big alcohol during the COVID-19 pandemic in Australia: Content analysis study. *JMIR Public Health and Surveillance, 7*(3). https://doi.org/10.2196/25202

Masheb, R. M., & Grilo, C. M. (2006). Emotional overeating and its associations with eating disorder psychopathology among overweight patients with binge eating disorder. *International Journal of Eating Disorders, 39*(2), 141–146. https://doi.org/10.1002/eat.20221

Mason, T. B., Heron, K. E., Braitman, A. L., & Lewis, R. J. (2016). A daily diary study of perceived social isolation, dietary restraint, and negative affect in binge eating. *Appetite, 97*, 94–100. https://doi.org/10.1016/j.appet.2015.11.027

Mason, T. B., Smith, K. E., Crosby, R. D., Engel, S. G., & Wonderlich, S. A. (2021). Examination of momentary maintenance factors and eating disorder behaviors and cognitions using ecological momentary assessment. *Eating Disorders*, 1–14. https://doi.org/10.1080/10640266.2019.1613847

Matton, A., Goossens, L., Braet, C., & Vervaet, M. (2013). Punishment and reward sensitivity: Are naturally occurring clusters in these traits related to eating and weight problems in adolescents? *European Eating Disorders Review, 21*(3), 184–194. https://doi.org/10.1002/erv.2226

Morales, I., & Berridge, K. C. (2020). 'Liking' and 'wanting' in eating and food reward: Brain mechanisms and clinical implications. *Physiology & Behavior, 227*, Article 113152. https://doi.org/10.1016/j.physbeh.2020.113152

Morgan, R. (2018). Metrotechs and millenials have taken to uber eats, menulog, Deliveroo and Foodora and more [Press release]. http://www.roymorgan.com/findings/7602-food-delivery-services-march-2018- 201805240625.

Morgan, R. (2020). Meal delivery services double usage in only 18 months. [Press release]. http://www.roymorgan.com/findings/8270-food-delivery-services- september-2019-202002030451.

Murray, S. B., Nagata, J. M., Griffiths, S., Calzo, J. P., Brown, T. A., Mitchison, D., Blashill, A. J., & Mond, J. M. (2017). The enigma of male eating disorders: A critical review and synthesis. *Clinical Psychology Review, 57*, 1–11. https://doi.org/10.1016/j.cpr.2017.08.001

Neumark-Sztainer, D., Wall, M., Guo, J., Story, M., Haines, J., & Eisenberg, M. (2006). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later? *Journal of the American Dietetic Association, 106*(4), 559–568. https://doi.org/10.1016/j.jada.2006.01.003

Paganini, C., Peterson, G., & Mills, J. (2018). Negative affect and situational antecedents of eating in disordered eating and normal population an ecological momentary assessment study. *Journal of Nutritional Biology, 4*(2), 289–297. https://doi.org/10.18314/JNB.V4I2.1384

Partridge, S. R., Gibson, A. A., Roy, R., Malloy, J. A., Raeside, R., Jia, S. S., … Redfern, J. (2020). Junk food on demand: A cross-sectional analysis of the nutritional quality of popular online food delivery outlets in Australia and New Zealand. *Nutrients, 12*(10), 3107. https://doi.org/10.3390/nu12103107

Portingale, J., Fuller-Tyszkiewicz, M., Liu, S., Eddy, S., Liu, X., Giles, S., & Krug, I. (2022). Love me Tinder: The effects of women's lifetime dating app use on daily body dissatisfaction, disordered eating urges, and negative mood. *Body Image, 40*, 310–321. https://doi.org/10.1016/j.bodyim.2022.01.005

Potterton, R., Richards, K., Allen, K., & Schmidt, U. (2020). Eating disorders during emerging adulthood: A systematic scoping review. *Frontiers in Psychology, 10*, 3062. https://doi.org/10.3389/fpsyg.2019.03062

Privitera, G. J. (2022). *Research methods for the behavioral sciences*. Sage Publications.

R Core Team. (2020). *R: A language and environment for statistical computing (version 4.0.2) [computer software]*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org.

Rajagopalan, A., Bhattacharya, A., Peebles, R., Dakanalis, A., & Timko, C. A. (2019, October). A literature review: Do DSM–5 severity indicators for eating disorders apply to children and adolescents? [Paper presentation]. In *American Academy of children and adolescent psychiatry 66th annual meeting, Chicago, Illinois, United States*.

Ranzenhofer, L. M., Engel, S. G., Crosby, R. D., Anderson, M., Vannucci, A., Cohen, L. A., Cassidy, O., & Tanofsky-Kraff, M. (2014). Using ecological momentary assessment to examine interpersonal and affective predictors of loss of control eating in adolescent girls. *International Journal of Eating Disorders, 47*(7), 748–757. https://doi.org/10.1002/eat.22333

Ray, A., Dhir, A., Bala, P. K., & Kaur, P. (2019). Why do people use food delivery apps (FDA)? A uses and gratification theory perspective. *Journal of Retailing and Consumer Services, 51*, 221–230. https://doi.org/10.1016/j.jretconser.2019.05.025

Richardson, T., Elliott, P., & Roberts, R. (2017). Relationship between loneliness and mental health in students. *Journal of Public Mental Health*. https://doi.org/10.1108/JPMH-03-2016-0013

Rodgers, R. F., Lombardo, C., Cerolini, S., Franko, D. L., Omori, M., Fuller-Tyszkiewicz, M., … Guillaume, S. (2020). The impact of the COVID-19 pandemic on eating disorder risk and symptoms. *International Journal of Eating Disorders, 53*(7), 1166–1170. https://doi.org/10.1002/eat.23318

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*(1), 19–28. https://doi.org/10.1016/j.beth.2016.09.007

Russell, S. L., Haynos, A. F., Crow, S. J., & Fruzzetti, A. E. (2017). An experimental analysis of the affect regulation model of binge eating. *Appetite, 110*, 44–50. https://doi.org/10.1016/j.appet.2016.12.007

Schaefer, L. M., Smith, K. E., Anderson, L. M., Cao, L., Crosby, R. D., Engel, S. G., … Wonderlich, S. A. (2020). The role of affect in the maintenance of binge-eating disorder: Evidence from an ecological momentary assessment study. *Journal of Abnormal Psychology, 129*(4), 387. https://doi.org/10.1037/abn0000517

Shank, L. M., Crosby, R. D., Grammer, A. C., Shomaker, L. B., Vannucci, A., Burke, N. L., … Tanofsky-Kraff, M. (2017). Examination of the interpersonal model of loss of control eating in the laboratory. *Comprehensive Psychiatry, 76*, 36–44. https://doi.org/10.1016/j.comppsych.2017.03.015

Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology, 4*, 1–32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415

da Silva, W. R., Swami, V., Nogueira Neves, A., Marôco, J., Ochner, C. N., & Alvares Duarte Bonini Campos, J. (2019). The body shape questionnaire is not invariant across sex: Evidence from Portuguese-speaking university students. *Perceptual & Motor Skills, 126*(3), 462–476.

Sinton, M. M., Goldschmidt, A. B., Aspen, V., Theim, K. R., Stein, R. I., Saelens, B. E., … Wilfley, D. E. (2012). Psychosocial correlates of shape and weight concerns in overweight pre-adolescents. *Journal of Youth and Adolescence, 41*(1), 67–75. https://doi.org/10.1007/s10964-011-9686-y

Smyth, J. M., Wonderlich, S. A., Sliwinski, M. J., Crosby, R. D., Engel, S. G., Mitchell, J. E., & Calogero, R. M. (2009). Ecological momentary assessment of affect, stress, and binge-purge behaviors: Day of week and time of day effects in the natural environment. *International Journal of Eating Disorders, 42*(5), 429–436. https://doi.org/10.1002/eat.20623

Southward, M. W., Christensen, K. A., Fettich, K. C., Weissman, J., Berona, J., & Chen, E. Y. (2014). Loneliness mediates the relationship between emotion dysregulation and bulimia nervosa/binge eating disorder psychopathology in a clinical sample. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity, 19*(4), 509–513. https://doi.org/10.1007/s40519-013-0083-2

Srivastava, P., Felonis, C. R., Clancy, O. M., Wons, O. B., Abber, S. R., & Juarascio, A. S. (2021). Real-time predictors of body dissatisfaction in females with binge eating: An ecological momentary assessment study. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity, 1–7*. https://doi.org/10.1007/s40519-021-01296-0

Steward, T., Mestre-Bach, G., Vintró-Alcaraz, C., Agüera, Z., Jiménez-Murcia, S., Granero, R., & Fernández-Aranda, F. (2017). Delay discounting of reward and impulsivity in eating disorders: From anorexia nervosa to binge eating disorder. *European Eating Disorders Review, 25*(6), 601–606. https://doi.org/10.1002/erv.2543

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin, 128*(5), 825. https://doi.org/10.1037/0033-2909.128.5.825

Stice, E., Burger, K., & Yokum, S. (2013). Caloric deprivation increases responsivity of attention and reward brain regions to intake, anticipated intake, and images of palatable foods. *NeuroImage, 67*, 322–330. https://doi.org/10.1016/j.neuroimage.2012.11.028

Striegel-Moore, R. H., Rosselli, F., Perrin, N., DeBar, L., Wilson, G. T., May, A., & Kraemer, H. C. (2009). Gender difference in the prevalence of eating disorder symptoms. *International Journal of Eating Disorders, 42*(5), 471–474. https://doi.org/10.1002/eat.20625

Strubel, J., & Petrie, T. A. (2017). Love me Tinder: Body image and psychosocial functioning among men and women. *Body Image, 21*(1), 34–38. https://doi.org/10.1016/j.bodyim.2017.02.006

Svaldi, J., Griepenstroh, J., Tuschen-Caffier, B., & Ehring, T. (2012). Emotion regulation deficits in eating disorders: A marker of eating pathology or general psychopathology? *Psychiatry Research, 197*(1–2), 103–111. https://doi.org/10.1016/j.psychres.2011.11.009

Tandon, A., Kaur, P., Bhatt, Y., Mäntymäki, M., & Dhir, A. (2021). Why do people purchase from food delivery apps? A consumer value perspective. *Journal of Retailing and Consumer Services, 63*, Article 102667. https://doi.org/10.1016/j.jretconser.2021.102667

Tan, W., Holt, N., Krug, I., Ling, M., Klettke, B., Linardon, J., Baxter, K., Hemmings, S., Howard, D., & Hughes, E. (2019). Trait body image flexibility as a predictor of body image states in everyday life of young Australian women. *Body Image, 30*, 212–220. https://doi.org/10.1016/j.bodyim.2019.07.006

Thomas, J. G., Doshi, S., Crosby, R. D., & Lowe, M. R. (2011). Ecological momentary assessment of obesogenic eating behavior: Combining person-specific and environmental predictors. *Obesity, 19*(8), 1574–1579. https://doi.org/10.1038/oby.2010.335

Volpe, U., Tortorella, A., Manchia, M., Monteleone, A. M., Albert, U., & Monteleone, P. (2016). Eating disorders: What age at onset? *Psychiatry Research, 238*, 225–227. https://doi.org/10.1016/j.psychres.2016.02.048

Vuillier, L., May, L., Greville-Harris, M., Surman, R., & Moseley, R. L. (2021). The impact of the COVID-19 pandemic on individuals with eating disorders: The role of emotion regulation and exploration of online treatment experiences. *Journal of Eating Disorders, 9*(1), 1–18. https://doi.org/10.1186/s40337-020-00362-9

Ward, A., & Mann, T. (2000). Don't mind if I do: Disinhibited eating under cognitive load. *Journal of Personality and Social Psychology, 78*(4), 753. https://doi.org/10.1037//0022-3514.78.4.753

Weinberger, N. A., Kersting, A., Riedel-Heller, S. G., & Luck-Sikorski, C. (2016). Body dissatisfaction in individuals with obesity compared to normal-weight individuals: A systematic review and meta-analysis. *Obesity Facts, 9*(6), 424–441. https://doi.org/10.1159/000454837

Wierenga, C. E., Ely, A., Bischoff-Grethe, A., Bailer, U. F., Simmons, A. N., & Kaye, W. H. (2014). Are extremes of consumption in eating disorders related to an altered balance between reward and inhibition? *Frontiers in Behavioral Neuroscience, 8*, 410. https://doi.org/10.3389/fnbeh.2014.00410

Wilfley, D. E. (2000). *Interpersonal psychotherapy for group. Basic Books*.

Witt, A. A., & Lowe, M. R. (2014). Hedonic hunger and binge eating among women with eating disorders. *International Journal of Eating Disorders, 47*(3), 273–280. https://doi.org/10.1002/eat.22171

Yee, Z. W., Griffiths, S., Fuller-Tyszkiewicz, M., Blake, K., Richardson, B., & Krug, I. (2020). The differential impact of viewing fitspiration and thinspiration images on men's body image concerns: An experimental ecological momentary assessment study. *Body Image, 35*, 96–107. https://doi.org/10.1016/j.bodyim.2020.08.008

Yeo, V. C. S., Goh, S. K., & Rezaei, S. (2017). Consumer experiences, attitude and behavioral intention toward online food delivery (OFD) services. *Journal of Retailing and Consumer Services, 35*, 150–162. https://doi.org/10.1016/j.jretconser.2016.12.013

Zinovyeva, E. V., Kazantseva, T. V., & Nikonova, A. N. (2016). Self-esteem and loneliness in Russian adolescents with body dissatisfaction. *Procedia-Social and Behavioral Sciences, 233*, 367–371. https://doi.org/10.1016/j.sbspro.2016.10.160