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Stomaching rejection: Self-compassion and self-esteem moderate the impact of daily social rejection on restrictive eating behaviours among college women

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Objective: The present study examined whether having high self-esteem or a self-compassionate perspective help mitigate the impact of daily social rejection on negative affect and restrictive eating behaviours.

Design: Following a baseline survey assessing self-esteem and self-compassion, 121 college women completed online daily diaries for one week.

Main Outcome Measures: Negative affect and restrictive eating behaviours.

Results: On days when women reported more rejection, they also reported higher restrictive eating behaviours and greater negative affect. Effects were moderated by self-esteem and self-compassion, such that the lower participants were in self-esteem or self-compassion, the stronger the positive relation between rejection and negative affect and restrictive eating. However, only the common humanity/isolation dimension of self-compassion significantly moderated daily effects of rejection when controlling for self-esteem. Mediated moderation results reveal different mechanisms by which self-esteem and self-compassion buffer against rejections’ effects on affect and restrictive eating.

Conclusion: Self-compassion and self-esteem influence the complex impact that social rejection has on affect and restrictive eating. More than other dimensions of self-compassion or self-esteem, remembering one’s common humanity can result in a healthier response to social rejection.

Keywords: restrictive eating; social rejection; self-compassion; SEM; daily diary; college women

A healthy relationship with food is vital to maintaining or improving overall health. Yet, restrictive eating (e.g. chronic restrained eating, extreme dieting) remains one of the most significant health issues facing college women (Delinsky & Wilson, 2008; Eisenberg, Nicklett, Roeder, & Kirz, 2011; Lowe et al., 2006; Smith-Jackson & Reel, 2012). As rates of obesity remain high in the United States (Ogden, Carroll, Kit, & Flegal, 2012), the prevalence of dysfunctional eating persists (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011). This health issue is particularly prevalent among college females; while the college years represent a period of rapid weight gain (Truesdale et al., 2006), women in college also report high rates of dysfunctional or pathological eating tendencies (Lowe & Thomas, 2009).

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While dysfunctional eating behaviours are influenced in part by biological factors (e.g. physiology and genetics; Ericsson, Poston, & Foreyt, 1996), the increase in these behaviours over the past several decades suggests that environmental or contextual factors are also to blame (Kumanyika et al., 2008). For example, restrictive eating – such as dieting, fasting or limiting food intake to a certain number of calories or certain foods or food groups – stems in part from a cultural context in the United States that promotes thinness, stigmatises overweight, yet encourages uncontrolled consumption of energy-dense, hyper-palatable foods (Irving & Neumark-Sztainer, 2002). However, restrictive eating behaviours may also be negatively impacted by stress (Byrd-Bredbenner, Quick, Koenings, Martin-Biggers, & Kattelmann, 2016); increased stress promotes unhealthy eating behaviours (Lowe, 2002; Macht, 2008). Furthermore, feelings of stress affect eating in a complex way. For roughly 70% of individuals, stress leads to an increase in food intake; for 30%, stress leads to restriction (Epel et al., 2004). Eating too much or too little are both maladaptive; however, the focus of the current research will be on restrictive eating, both because it is understudied in relation to social rejection and disproportionately affects college women.

Social rejection can be a potent source of stress (Williams, Forgas, & von Hippel, 2005). Furthermore, the mindset one has when facing rejection can, in turn, impact reactions to rejection and its downstream consequences. Self-focused attitudes, or different ways of relating to oneself – including self-esteem and self-compassion – may buffer the effects of rejection on unhealthy eating, though this potential is understudied. The first aim of the present study was to examine, using daily diary methodology, the associations of daily social rejection with restrictive eating behaviours and affective precursors that mediate this relationship. The second aim of our study was to test whether self-esteem and self-compassion differentially reduce the negative impact of rejection on restrictive eating among college women.

Social rejection and restrictive eating
Social rejection is a common yet painful experience that occurs when an individual is deliberately excluded from a social interaction for social (rather than practical) reasons (Leary, 2001). Social rejection, even by strangers, increases health risk behaviours and decreases health protective behaviours (Abrams, Hogg, & Marques, 2005; Baumeister, DeWall, Ciarocco, & Twenge, 2005; Pascoe & Smart Richman, 2009), including...
unhealthy and healthy eating, respectively (Salvy et al., 2011; Twenge, Catanese, & Baumeister, 2002). For example, research on the consequences of social rejection found that rejected individuals drink less of a purportedly ‘healthy’ but bad-tasting beverage and eat more unhealthy cookies (Baumeister et al., 2005); these findings were replicated and even more pronounced among socially anxious individuals (Oaten, Williams, Jones, & Zadro, 2008). Another study found that overweight participants responded affirmatively for food during an operant conditioning task and had more subsequent energy intake if they were rejected than if they were included in an earlier lab task (Salvy et al., 2011).

But this research is not limited to eating too much when faced with the stress of social rejection. More recent research examined individual differences that may lead some to eat more when rejected, and some to eat less. For example, after being rejected, college students who habitually ate more in response to stress (stress hyperphagics) ate significantly more than habitual stress restrictors (stress hypophagics), who restricted their food intake in the face of social rejection (Sproesser, Schupp, & Renner, 2014). There is a dearth of research examining restrictive eating cognitions and behaviours in the face of social rejection, even though both restrictive eating and social rejection are common incidents among college women.

**Mediating role of negative affect**

There are several mechanisms that have been proposed to explain why individuals make unhealthy eating decisions when rejected, but one of the most frequently studied is negative affect. Literature on the affective consequences of rejection and the stress and coping literature offer support for how negative affect may lead to unhealthy eating. Furthermore, the emotional eating literature (e.g. Arnow, Kenardy, & Agras, 1995; Waller & Osman, 1998) offers a lens through which to explore the causal link between rejection and unhealthy eating.

Rejection has pronounced affective consequences, leading to negative responses such as shame, sadness, anxiety and distress (Dickerson, Gruenewald, & Kemeny, 2004; Leary, Tambor, Terdal, & Downs, 1995; Leary, Twenge, & Quinlivan, 2006; Svetieva et al., 2016; Williams, 2007; Zwolinski, 2014). Though affect is often measured globally, more specific facets of negative affect are sometimes isolated and studied. For example, shame: A growing body of literature on self-preservation theory (Gruenewald et al., 2004) proposes that shame is evoked by social evaluative threat
Both chronic and acute experiences of shame, measured by self-report and with physiological indicators (e.g. sympathetic nervous system and hypothalamic–pituitary–adrenal axis activity), are impacted by social threat (Rohleder, Chen, Wolf, & Miller, 2008). Yet, one meta-analysis on exclusion and rejection (Blackhart, Nelson, Knowles, & Baumeister, 2009) concluded that rejection causes significant shifts in a broader range of emotion and affect. Simply put, rejected people feel globally worse—beyond simply ashamed—than their accepted and neutral-condition counterparts. In light of evidence that multiple dimensions of negative affect may be affected by rejection, a global measure of negative affect will be included in the present study to expand on previous research examining only a single dimension (e.g. shame).

Global negative affect in turn, leads to unhealthy dietary patterns (Grossniklaus et al., 2010; Haedt-Matt & Keel, 2011; Lane, 2007; Macht, 2008). In one study utilising Ecological Momentary Assessment (EMA), college women reported mood and eating behaviours throughout the day (Heron, Scott, Sliwinski, & Smyth, 2014). Results confirmed that negative affect—including worry, sadness and unhappiness—was higher when women reported both restricting food intake and losing control over their eating. Negative emotional reactions to rejection may also lead to the use of maladaptive eating behaviours as emotion-focused coping (Arnow et al., 1995; Cervera et al., 2003; Evers, Stok, & de Ridder, 2010; Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2009). Using food to cope with the emotional consequences of stressors is widely accepted to be a form of maladaptive emotion regulation that is a significant contributor to the current obesity epidemic (Adam & Epel, 2007).

**Reacting to rejection: The role of the self**

If restrictive eating is one coping response to social rejection, replacing this mechanism with another strategy could reduce the negative impacts of rejection on eating. However, this strategy would need to address the emotion regulation needs of a rejected individual in order to replace emotion-focused coping. Because rejection is threatening (Leary & Baumeister, 2000; Williams, 2001), since it is viewed as a de-valueation of the self by others, it follows that self-constructs would be important buffers in the face of rejection. This phenomenon is partially due to the ways in which individuals use self-reflection and self-reassurance as a form of intrapersonal relating when that interpersonal relating is threatened, a key tenant of social mentality theory (Gilbert, 1989, 2005). Fostering a kinder way of relating to oneself, for instance through care-seeking
or care-giving mentalities, is one way of intrapersonal relating when relating to others is not possible or is threatened (Hermanto & Zuroff, 2016) – such as in the case of rejection.

Indeed, several methods of relating to the self during and following rejection have been proposed and explored, such as boosting self-esteem and engaging in self-affirmation (Sherman & Cohen, 2006; Smart Richman & Leary, 2009; Sommer, 2001). Furthermore, self-compassion has been proposed as an important buffer in the face of food-related stress or appearance-related threats on eating behaviours (Adams & Leary, 2007; Breines, Toole, Tu, & Chen, 2014). Thus, in the present study, two related but unique concepts capturing how one relates to the self will be examined as possible buffers for the negative effects of rejection on restrictive eating: self-esteem and self-compassion.

**Self-esteem**

Having high self-esteem, or confidence in one’s own abilities, worth and social rank, can affect one’s reaction to social rejection. Indeed, low self-esteem predicts stronger negative reactions to social rejection: lower levels of self-esteem relate to greater activation in the brain regions associated with social pain (Kashdan et al., 2014). Low self-esteem is also associated with responding to rejection with more self-blame and greater cortisol reactivity (Ford & Collins, 2013). After a personal failure or after experiencing rejection, individuals low in self-esteem tend to dwell more on the negative outcome, blame themselves more for it and generally take it more personally (Dandeneau & Baldwin, 2004). According to Sociometer theory (Leary et al., 1995), self-esteem can also be a gauge of one’s inclusionary status; people with low self-esteem generally perceive more rejection, while people with higher self-esteem tend to perceive more inclusion and less rejection (Leary et al., 1995). So, even if rejection happens, having high self-esteem helps one to perceive it less often and as less severe, while low self-esteem leads to more negative affect, especially shame and blame. Additionally, having high self-esteem has been shown to be protective against maladaptive eating, ranging from bulimic behaviours (Vohs et al., 2001) to dysfunctional and restrictive eating (Shroff & Thompson, 2006). Thus, we expect that self-esteem will buffer against the effects of daily rejection on negative affect and, in turn, restrictive eating.

But the notion of self-esteem as a powerful protective mechanism has faced challenges in the literature. Traditionally, self-esteem is defined as a broad self-evaluation...
that is boosted by reaching goals yet threatened by perceived failure (Kernis, 2003). Thus, self-esteem is often contingent on one feeling competent or successful in important life domains, including but not limited to social belonging (Deci & Ryan, 1995). Global self-esteem is based on consistent positive evaluation of the Self, however when something negative and unavoidable happens – such as inevitable social rejection – ego-defensive drawbacks such as narcissism emerge because these experiences can be dissonant with a positive evaluation of the self (Neff, 2003b). As such, self-esteem can be related to maladaptive attitudes such as self-enhancement bias (Sedikides & Gregg, 2008). Thus, there is a need to explore the buffering potential of other positive self-attitudes, above and beyond self-esteem, that are not contingent on success (or avoidance of failures) or evaluations of the self. Self-compassion offers one such alternative.

**Self-compassion**

Another positive self-attitude that has emerged in the literature as an alternative way of relating to oneself, and help in coping with social stressors such as rejection, is self-compassion. Self-compassion has not yet been explored in the face of rejection, and is particularly relevant to inspiring healthy eating cognitions and behaviours. Self-compassion involves directing the same kind of kindness, understanding and forgiveness towards oneself when faced with adversity that one would convey to a loved one in the same situation. It is a malleable, non-evaluative, emotionally positive self-attitude (Neff, 2003a) that has demonstrably promoted adaptive psychological functioning (Neff, Kirkpatrick, & Rude, 2007), positive mood (Odou & Brinker, 2014) and physical health (Sirois, Kitner, & Hirsch, 2014) including healthy eating and intuitive eating among college women (Kelly, Miller, & Stephen, 2016; Kelly & Stephen, 2016; Schoenefeld & Webb, 2013). In fact, previous research has elucidated the impacts of self-compassion on daily restrictive eating: on days where individuals were more self-compassionate, they reported less disordered (including restrictive) eating (Breines et al., 2014, Study 1). Additionally, recent research among college women found that daily fluctuations in self-compassion predicted fluctuations in eating behaviours: on days when women reported greater self-compassion, they also reported more intuitive eating – a measure of a healthy relationship with food marked by the propensity to follow hunger and satiety cues when deciding how much, when and what to eat – while daily self-esteem was not associated with intuitive eating (Kelly & Stephen, 2016; Kelly et al., 2016).

Self-compassion is a multi-dimensional construct; Neff (2003a) conceptualised self-compassion as comprised of three components: self-kindness (vs. self-judgment), common humanity (vs. isolation) and mindfulness (vs. over-identification). Many studies use a global measure of self-compassion – a mean or sum of all three components (e.g. Kelly & Stephen, 2016). However, the exact factor structure of a global self-compassion scale is the subject of current debate (e.g. Costa, Marôco, Pinto-Gouveia, Ferreira, & Castilho, 2016), and researchers have begun to examine and notice differences in what each component predicts. Therefore, self-compassion as a whole (mean score of all three components) will be initially examined, but secondary analyses will focus on the three components of self-compassion separately.
Self-compassion and self-esteem as independent predictors

Self-compassion has been shown to be distinct from other ways of relating to oneself (Neff, 2003b), but it is most often compared to, and contrasted, with self-esteem (Neff & Vonk, 2009). Unlike self-esteem, which boosts well-being because it helps people feel superior and self-confident, self-compassion boosts well-being because it helps people feel secure and safe, and does not rely on comparing oneself to others or derogating others to boost one’s own feelings of self-worth (Neff, 2011). Self-compassion and self-esteem are highly correlated, so studies examining self-compassion often include measures of self-esteem to test whether self-compassion predicts outcomes over and above self-esteem (Neff & Vonk, 2009). In the present research, analyses of self-compassion control for self-esteem, and analyses of self-esteem control for self-compassion, to determine if each self-attitude predicts unique variance in the predicted associations.

Moderating roles of self-focused constructs: Different mechanisms of mediation

One key distinction that sets self-compassion apart from self-esteem is how the self relates and reacts to emotion. Self-esteem is effective in the face of threat because it provides a distraction or replacement for negative feelings – by feeling better about oneself. It is an effective coping mindset because it allows the target of rejection to ignore or push aside painful feelings or replace them with warmer, more positive self-focused feelings. Crucially, self-esteem is effective because it reduces the negative impact of rejection on negative affect or related constructs. Self-compassion, on the other hand, requires that individuals do not avoid or repress painful feelings, so they can be compassionate about their experience in the first place (Neff, 2003a). Self-compassion requires that people do not over-identify with their emotions, allowing for cognitive space to extend oneself kindness or recognise the broader human context – or common humanity – of one’s experience of pain, suffering or failure (Bennett-Goleman, 2001; Neff, 2003a). Thus, we would not predict that self-compassion, on its own, buffers against rejections’ impact on self-reported affect or feelings of control. We would, however, predict that self-compassion would buffer the effects of negative affect on more downstream behaviours such as restrictive eating (Breines et al., 2014).

The present study

The present research used a seven-day daily diary methodology to examine, over time, the association between social rejection and restrictive eating in a sample of college women. In order to probe the mechanisms behind this association, we also examined daily negative affect. Prior to the week-long diary phase, in a separate assessment, we measured trait-level constructs, including self-compassion and self-esteem. The aims of the study were to elucidate the impacts of daily rejection on affect and restrictive eating behaviours, and determine the mechanisms by which (and extent to which) positive self-attitudes buffer these associations. The following hypotheses were tested:

H1: Individuals who report more daily social rejection will report more negative affect and increased restrictive eating behaviours.
H2: Self-esteem will buffer (moderate) the impact of daily rejection on restrictive eating behaviours, such that the relationship between rejection and eating will be stronger for individuals low in (vs. high in) self-esteem. Self-esteem will similarly buffer rejection’s impact on negative affect, such that the relationship between rejection and negative affect will be strongest for women low in self-esteem.

H3: (a) Self-compassion will buffer the impact of daily rejection on restrictive eating behaviour, such that the relationship between rejection and eating will be stronger for individuals low (vs. high) in self-compassion. Self-compassion will also buffer the effect of negative affect on restrictive eating behaviours, such that the relationship between negative affect and behaviour will be strongest for women low in self-compassion.

(b) Exploratory analyses will examine the relative buffering potential of the three different components of self-compassion by examining each component in isolation.

H4: Negative affect will mediate the effects of rejection on restrictive eating. Given hypotheses 2 and 3, self-esteem and self-compassion will moderate this indirect mediation path.

Method

Participants

Potential participants (college women over 18 who participated in research studies for departmental credit) were invited to take part in an online study described as a study designed to help us learn more about college women’s day-to-day feelings, life experiences and health behaviours. Of the 133 undergraduate women who provided consent to participate, 121 (\(M_{age} = 19.47\) (SD = 2.06); 71.9% White) completed measures for at least five diary entries in addition to the baseline. When data were available, participants who were excluded from analyses were compared to the rest of the sample on all study variables; means on available study variables did not differ significantly between these participants and those included in main analyses (\(p_s > .23\)).

Procedure

After an electronic informed consent process, participants filled out an initial baseline survey, which included measures of trait self-compassion, self-esteem and BMI. Between 1 and 3 weeks later, a seven-day daily diary data collection took place during the same week for all participants. All data was collected via SurveyMonkey (2015). Participants completed the daily diary between 5 pm and midnight, and were prompted by email each evening to complete the surveys. The protocol for this daily diary study was most expressly adapted from a recent study on daily self-compassion and disordered eating (Breines et al., 2014).
Table 1. Bivariate correlations, means and standard deviations of all study variables.

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BMI</td>
<td>22.7 (3.7)</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>2. Self-compassion</td>
<td>2.83 (.60)</td>
<td>−.26**</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>3. SC: CH/IS</td>
<td>2.87 (.68)</td>
<td>−.27**</td>
<td>.88***</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>4. SC: SK/SJ</td>
<td>2.76 (.69)</td>
<td>−.19*</td>
<td>.92***</td>
<td>.70***</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>5. SC: MI/OI</td>
<td>2.86 (.62)</td>
<td>−.26**</td>
<td>.91***</td>
<td>.74***</td>
<td>.75***</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>6. Self-esteem</td>
<td>3.68 (.73)</td>
<td>−.14</td>
<td>.61***</td>
<td>.55***</td>
<td>.59***</td>
<td>.50***</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>7. Daily rejection</td>
<td>1.57 (.37)</td>
<td>−.02</td>
<td>−.20*</td>
<td>−.30**</td>
<td>−.18*</td>
<td>−.22*</td>
<td>−.28**</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>8. Negative affect</td>
<td>1.86 (.60)</td>
<td>−.07</td>
<td>−.40***</td>
<td>−.40***</td>
<td>−.33***</td>
<td>−.35***</td>
<td>−.30**</td>
<td>.65***</td>
<td>−</td>
</tr>
<tr>
<td>9. Restrictive eating</td>
<td>1.80 (.71)</td>
<td>.17</td>
<td>−.32***</td>
<td>−.29**</td>
<td>−.30**</td>
<td>−.34***</td>
<td>−.15</td>
<td>.23*</td>
<td>.37***</td>
</tr>
</tbody>
</table>

Note: Daily constructs represent grand mean across the 7 days.  
*p < .05; **p < .01; ***p < .001.
Baseline survey measures

Self-esteem
Participants responded to the 10-item Rosenberg self-esteem scale (Rosenberg, 1979). Sample items include "I feel that I have a number of good qualities and On the whole, I am satisfied with myself" (1 = not at all like me to 5 = very much like me). A mean score was calculated ($\alpha = .88$).

Self-compassion
Self-compassion was measured using the 26-item Self-Compassion Scale (Neff, 2003b). Participants were asked how they typically act towards themselves in difficult times. Six subscales reflected the dimensions self-compassion: common humanity (e.g. "When I’m down and out, I remind myself that there are lots of other people in the world feeling like I am"); isolation (e.g. "When I’m really struggling, I tend to feel like other people must be having an easier time of it"); self-kindness (e.g. "When I’m going through a very hard time, I give myself the caring and tenderness I need"); self-judgment (e.g. "I’m intolerant and impatient towards those aspects of my personality I don’t like"); mindfulness (e.g. "When something painful happens, I try to take a balanced view of the situation"); and over-identification (e.g. "When something upsets me I get carried away with my feelings"). Responses ranged from 1 = Almost never to 5 = Almost always. Reverse-scores were calculated for isolation, self-judgement and over-identification, and then mean scores were calculated for each subscale to assess each dimension of self-compassion: Common Humanity vs. Isolation (CH/I; $\alpha = .75$), Self-Kindness vs. Self-Judgment (SK/SJ; $\alpha = .86$) and Mindfulness vs. Over-identification (M/OI; $\alpha = .73$). The reliability for the full 26-item Self-Compassion Scale was also high ($\alpha = .91$).

Body Mass Index (BMI)
Past research examining the associations between self-compassion and eating outcomes and rejection and eating outcomes have adjusted for BMI (e.g. Blechert, Goltsche, Herbert, & Wilhelm, 2014; Schoenefeld & Webb, 2013), as BMI relates significantly to eating outcomes and is therefore a potential confound. Therefore, to control for such confounding, BMI was calculated using height and weight, which were assessed via self-report in imperial units.

Daily diary measures
Daily surveys were assessed each day, for seven days (but not at baseline), to measure within-person covariation on main predictor and outcome variables.

Rejection experiences
Daily experiences of rejection were measured each day by first asking if participants had felt rejected or excluded by a (1) friend, (2) romantic partner, (3) someone else at work or school; felt excluded or left out by a (4) group of people and (5) felt rejected, excluded or left out on social media (0 = did not happen, 1 = occurred but not
meaningful, 2 = occurred and somewhat meaningful, 3 = occurred and very meaningful, 4 = occurred and extremely meaningful). Participants were also asked how much they felt rejected, excluded or left out, alone, and connected to others (reverse coded) (1 = very slightly or not at all to 5 = extremely). Means for all nine rejection items for each day were calculated to form a rejection experiences composite score (daily as = .82 to .89).

Negative affect
Participants were asked to reflect on the extent to which they felt three emotions during the day: Ashamed, Sad and Anxious (1 = very slightly or not at all to 5 = extremely). Means for the three items were calculated for each day (as = .66 to .78).

Restrictive eating behaviours
Restrictive disordered eating behaviours were assessed using items from a maladaptive eating scale used by Breines and colleagues (2014). Each day participants were asked how frequently they engaged in several disordered eating behaviours, e.g. avoided eating when you were hungry, tried to control your weight by eating little or no food (6 items, daily as = .79 to .84). Responses ranged from 1 = never to 5 = always.

Results
Descriptive statistics
Means, standard deviations and bivariate correlations between study variables are shown in Table 1. BMI ranged from underweight (17.2) to obese (34.7). Daily reports of restrictive eating behaviour were comparable to other studies examining college women (e.g. Heron et al., 2014; Zeigler-Hill & Noser, 2015), M = 1.80, SD = .71. Additionally, daily reports of rejection were relatively low overall, M = 1.57, SD = .37, however they varied both between participants and across days.

BMI was correlated negatively with each of the 3 self-compassion subscales, Common Humanity vs. Isolation (CH/I; r = .27, p < .003), Self-Kindness vs. Self-Judgment (SK/SJ; r = -.19, p < .05) and Mindfulness vs. Over-identification (M/OI; r = -.26, p < .005). The self-compassion subscales also correlated highly with each other, as well as with self-esteem (all rs > .25). Daily rejection was correlated positively with negative affect (r = .65, p < .001) and restrictive eating (r = .23, p < .02). Perceptions of rejection were also negatively correlated with all three self-compassion subscales, as well as self-esteem (all ps < .01).

Multilevel random effects models
Analytic strategy
Hierarchical Linear Modelling (HLM) was conducted using MPlus software (Muthén & Muthén, 2011). Multiple observations taken from individuals can be thought of as multi-level data, with daily observations (e.g. diary entries) constituting the Level 1 data and the individual characteristics (e.g. trait-level moderators) constituting level 2 data.
Therefore, where moderation of self-compassion and self-esteem was examined, daily measures were included as Level 1 data in the models, while baseline measures were included as Level 2 data. HLM provides independent estimates of associations between Level 1 constructs and models them at Level 2 using maximum likelihood estimation. We used a nested data structure, multilevel random effects coefficient modelling, to measure how the between-person Level 2/baseline constructs moderate the within-person Level 1/daily relationships. This was performed by examining, in separate models for each moderator and outcome, how self-compassion and self-esteem moderate the effects of daily rejection on restrictive eating and negative affect. Each self-attitude was entered into the model alone and then subsequently with the other self-attitude included as a covariate. BMI was included as a covariate in all models. Analyses included the MPlus default missing data estimation approach, full information maximum likelihood (FIML), which assumes data are missing at random (MAR: that is, random contingent on controlling for all measured variables in the model).

**Hypothesis 1: Direct effects of rejection on restrictive eating and negative affect**

As expected, analyses revealed a significant positive association between self-reported rejection and restrictive eating ($b = .092, p < .02$), not taking into account baseline self-compassion or self-esteem. There was also a significant association between rejection and negative affect ($b = .26, p < .001$). Thus, on days when individuals felt more rejected, they also reported more restrictive eating and greater negative affect.

**Moderators of the association between rejection and eating-related outcomes**

Where moderation of self-esteem and self-compassion was present, we probed significant interactions by graphing the association between the Level 1 variables (daily rejection and restrictive eating) for participants who scored relatively low (−1 SD) vs. high (+1 SD) on the self-compassion subscales and self-esteem. Several significant interactions emerged:

**Hypothesis 2: Self-esteem**

Self-esteem, controlling for BMI, moderated the effects of rejection on negative affect ($b = −.042, p < .04$), such that the lower participants were in self-esteem, the stronger the positive relationship between rejection and negative affect (Figure 1(a)). However, while an interaction indicates the slopes are significantly different from each other, simple slopes revealed that the relationship between rejection and negative affect is significant at both high and low levels of self-esteem ($ps < .001$). Furthermore, self-esteem, controlling for BMI, moderated the effects of rejection on restrictive eating ($b = −.076, p < .001$), such that the lower participants were in self-esteem, the stronger the positive relationship between rejection and restrictive eating (Figure 1(b)). Simple slopes revealed the relationship between rejection and restrictive eating was only significant at low levels of self-esteem ($b = .131, p < .001$). Notably, when self-compassion was entered into the two-level random effects model as a covariate, the moderating effects of self-esteem fell below significance: controlling for self-compassion (all subscales combined) and BMI, there was no moderating effect.
of self-esteem on the relationship between daily rejection and negative affect \((b = -0.031, p = .198)\) or the relationship between daily rejection and disordered eating behaviours \((b = -0.055, p = .110)\) independent of self-compassion.

**Hypothesis 3: Self-compassion**

Controlling for BMI, self-compassion moderated the effects of rejection on negative affect \((b = -0.046, p < .04)\). The less self-compassionate participants were, the stronger the positive relationship between rejection and restrictive eating (Figure 2(a)). However, simple slopes once again revealed that the relationship between rejection and negative affect is significant at both high and low levels of self-compassion \((ps < .01)\). Self-compassion also moderated the effects of rejection on restrictive eating \((b = -0.072, p < .013)\), such that participants lower in self-compassion indicated a stronger relationship between rejection and restrictive eating (Figure 2(b)). Simple slopes computed at +/-1 SD revealed the relationship between rejection and restrictive eating was significant at low levels of self-compassion \((b = .113, p < .001)\) but not high SC \((b = .027, p = .24)\).

Similar to the effect of adding self-compassion to the self-esteem moderation model, when self-esteem was entered into this model, the moderating effects of self-compassion were no longer significant, indicating joint effects: controlling for self-esteem and BMI, there was no moderating effect of self-compassion on the relationship between rejection and affect \((b = -0.023, p = .408)\) or rejection and disordered eating \((b = -0.046, p = .326)\) independent of self-esteem.

**Self-compassion components**

Probing the three different components of self-compassion while controlling for self-esteem, however, revealed one buffering effect independent of self-esteem: controlling for BMI and self-esteem, the common humanity/isolation (CH/I) component of self-compassion moderated the effects of rejection on restrictive eating \((b = -0.068, p < .05)\), such that the lower participants were in CH/I, the stronger the relationship between rejection and restrictive eating (Figure 3). CH/I only marginally moderated the effect of rejection on negative affect \((b = -0.039, p = .07)\). Neither self-kindness/self-judgment (SK/SJ) nor mindfulness/over-identification (MI/OI) significantly moderated, independent of self-esteem, the effects of daily rejection on affect or restricted eating \((ps > .11)\).

**Hypothesis 4: Mediated moderation**

To determine the extent to which negative affect explains the relationship between rejection and restrictive eating – at different levels of trait self-compassion and self-esteem – mediated moderation analyses were conducted using methods developed by MacKinnon and colleagues (e.g. MacKinnon & Valente, 2014). Mediated moderation was conducted only on those rejection-eating relationships where significant moderation of self-attitudes was present. We first examined within-level mediation on the level 2 data, with between-level moderation at level 1. Prior to inclusion in analyses, all baseline Level 2 variables were centred around their group mean, per previous research
utilising multilevel HLM (e.g. David & Suls, 1999). Then, at the within level, we calculated three slope estimates for the effect of (1) rejection on the affect, (2) affect on restrictive eating and (3) rejection on restrictive eating. Then, at the between level, we regressed each centred proposed moderator on the three slope estimates. Mediated moderation was present when either the rejection → mediator path was moderated and the mediator → outcome path was constant, or the rejection → mediator path was constant and the mediator → outcome path was moderated, or both pathways were moderated. The PROCESS macro (Hayes, 2013) was then used to calculate indices of the strength of these indirect mediation effects. Finally, using RMediation (Tofghi & MacKinnon, 2011), we tested for a simple mediation effects and confidence intervals at +/-1 SD levels of the moderator variables to probe the presence of mediation at high and low levels of self-esteem and self-compassion.

Two significant patterns of mediated moderation emerged. The first pattern is rejection to negative affect moderation, in which the moderator qualifies the rejection-affect path of the model, but the affect-eating path is constant (Figure 4(a)). The second pattern is affect to eating moderation, in which the moderator qualifies the affect-eating path, but the rejection-affect path is constant (Figure 4(b)). No models in which the self-esteem or self-compassion moderated both the rejection → affect and affect → eating behaviour pathways fit the data significantly.

The significant patterns of mediation of a moderator (e.g. Fairchild & MacKinnon, 2009) will be referred to as rejection-affect and affect-eating moderation models, respectively. Within rejection-affect moderation models, unstandardised betas representing the significant constant relationship between affect and eating and the moderation of rejection and affect are presented; within affect-eating moderation models, unstandardised betas representing the significant constant relationship between rejection and affect and the moderation of affect and eating are presented. Finally, estimates (μ) and 95% confidence intervals representing the indirect rejection-affect-eating effects at +/-1 SD of the moderators (self-esteem and the common humanity component of self-compassion) are reported.

When self-esteem was entered into the model as a moderator, by itself but controlling for BMI, only rejection-affect moderation was present: the rejection → negative affect pathway was moderated by self-esteem (b = -.039, p < .05), while the negative affect → restrictive eating pathway was not (b = .074, p < .007), as illustrated in Figure 4(a) (mediated moderation index: -.86, CI: [-.289, -.007]). For low self-esteem participants, the indirect effect estimate is μ = .021 and the distribution of the product of coefficients method 95% CI is [.006, .037], indicating an indirect effect. For high self-esteem participants, the indirect effect estimate is μ = .017 [.005, .031], also indicating an indirect effect. However, when CH/I was entered into the model along with self-esteem, the rejection-affect moderation was no longer significant.

When potential moderation of self-compassion (full scale) was entered into the model, controlling for BMI only (but not self-esteem), affect-eating moderation was present: the rejection → negative affect pathway was constant (b = .253, p < .001), while the negative affect → restrictive eating pathway was moderated by self-compassion (interaction b = -.18, p < .001), as in Figure 4(b) (moderated mediation index: -.14; SE(boot) = .104; CI: [-.395, -.011]). For participants lower in self-compassion, the indirect effect estimate is μ = .032 and the distribution of the product of coefficients method
95% CI is [.013, .053], indicating an indirect effect. However, for participants higher in self-compassion, the indirect effect estimate is $\mu = .003 [-.014, .02]$, indicating no indirect effect.

Finally, when potential moderation of CH/I was entered into the model, controlling for BMI and self-esteem, affect-eating moderation was once again present: the rejection $\rightarrow$ negative affect pathway was constant ($b = .251$, $p < .001$), while the negative affect $\rightarrow$ restrictive eating pathway was moderated by CH/I (interaction $b = -.13$, $p < .001$), as illustrated in Figure 4(b) (moderated mediation index: $-\cdot.11$; SE(boot) = .090; CI: $[-.351, -.013]$). For low CH/I participants, the indirect effect estimate is $\mu = .068$ and the distribution of the product of coefficients method 95% CI is [.047, .092], indicating an indirect effect. However, for high CH/I participants, the indirect effect estimate is $\mu = -.006 [-.023, .01]$, indicating no indirect effect. Since this mediated moderation held even when both moderators were included in the model, we can conclude that CH/I moderates the rejection $\rightarrow$ negative affect $\rightarrow$ restrictive eating mediation model (1) because it moderates the affect $\rightarrow$ eating pathway and (2) over and above the moderating role of self-esteem.

Discussion

Across several days, self-reported rejection was associated with increased negative affect and higher instances of restrictive, maladaptive eating behaviours among college women. However, this relationship is qualified by the women’s self-attitudes. A growing body of research identifies the importance of examining self-esteem and self-compassion in the face of threat (Adams & Leary, 2007; Ford & Collins, 2013; Neff, 2011), however the present research is the first to explore the role of self-compassion and negative affect in disordered eating-related processes in the face of daily social rejection. Previous research supports that being compassionate towards oneself is compatible with a healthy relationship with food (Kelly & Stephen, 2016; Kelly et al., 2016; Schoenefeld & Webb, 2013), evidenced by finding that within-person variability in self-compassion over time predicts more adaptive daily eating outcomes over the same time period (e.g. Kelly et al., 2016). However, asking women about experiences with social rejection over the course of a week, along with assessing their feelings and eating behaviours, reveals the mediation processes that drive the protective nature of certain self-attitudes can against social threat – in addition to elucidating how more static, between-person variability in self-compassion buffers this effect.

Beyond self-esteem: Remembering common humanity in the face of rejection

Challenging previous research about the power of self-esteem in the face of rejection (Leary et al., 1995), self-esteem alone – i.e. over and above self-compassion – did not protect against the negative effects of rejection; only when self-compassion was not entered into the model did self-esteem’s buffering effects emerge. This somewhat challenges previous research that self-compassion and self-esteem are distinct and separable constructs (Neff, 2011), and suggests joint effects. Perhaps, speculatively, it is easier to be compassionate towards yourself when you hold yourself in high esteem, or it is easier to like yourself when you are compassionate towards yourself; future research
examining changes in both self-esteem and self-compassion over time may be necessary to explore these relationships.

When examining the buffering potential of self-compassion in the face of rejection, the protective effects were similar to that of self-esteem. However, only the Common Humanity/Isolation component buffered above and beyond that of self-esteem. This finding supports the very reason why self-compassion may be particularly helpful in the face of rejection – and one which sets it apart from other positive self-attitudes: The converse of common humanity is isolation (Neff, 2003a), so it follows that when people reframe rejection as a universal and common experience, they feel less isolated and thus experience greater feelings of belonging (a vital need that is threatened by rejection). To the extent that self-compassion includes an acknowledgement that rejection is common, and millions of others experience it every day, self-compassionate people should feel less alone in their experience – even though the immediate environment may be rejecting. No other self-attitude emphasises this ‘we are all in this suffering together’ component, and since isolation is a key component of rejection, self-compassion as coping with rejection offers unique buffering potential. Accordingly, the present research found that the common humanity vs. isolation (CH/I) component may be the component of self-compassion that is particularly important in buffering rejection’s effects.

The particular relevance of common humanity in the face of rejection may extend the implications of this research beyond the domain of self-compassion, as the mechanism behind this dimension may reflect a ‘horizontal’ form of social comparison. Unlike vertical social comparison, which conceptualises others in relation to the self in terms of status, dominance, or agency (whether one is better/worse than others, a dimension more aligned with self-esteem), horizontal social comparison emphasises solidarity or communion with others (e.g. Locke, 2003, 2005). When people compare horizontally, they are reflecting on how similar one is to a target – a connective comparison. In the case of common humanity, such a target is very broad, ranging from one’s community to humanity as a whole; and this connective comparison may be protective in the same way that common humanity is protective (Sasaki, Ko, & Kim, 2014). Thus, beyond implications for self-compassion research, the present findings may have implications pertinent to similar research examining the role of the communal function of social comparison in the context of social-evaluative threat.

Pitfalls of self-esteem
While one component of self-compassion buffered against rejection independent of self-esteem, self-esteem was not protective independent of self-compassion. This may be related to some common aspects of self-esteem that can make the pursuit of it maladaptive (Crocker, Luhtanen, Cooper, & Bouvrette, 2003). Global self-esteem depends on evaluations of self-worth in many domains, including social approval (Harter, 1999). This contingent self-attitude can then backfire when faced with information in the environment that is dissonant, or not compatible, with a positive self-view. So, it is best for individuals with high self-esteem to ignore or brush off negative social feedback, to maintain their enhanced (and potentially biased) self-view. Indeed, in the present research, self-esteem buffered against rejections’ impacts on negative affect: those high in self-esteem were less affected by rejection vis a vis both negative affect and
restrictive eating. Self-compassion, on the other hand, did not similarly protect against negative affective responses to rejection; only rejection’s effects on restrictive eating.

This is not to say, however, that the buffering potential of self-esteem is moot. In fact, in many of the analyses in the present study, self-compassion and self-esteem have complementary – even joint – effects. Complex combinations of the two self-attitudes seem to act on negative affect and the downstream health effects thereof. Investigating these combinations would require employing three-way interactions between self-esteem, self-compassion and rejection experiences. The sample size in the present study was underpowered to detect such complex effects; future research could undertake this exploration.

**Self-esteem and self-compassion: Different buffering mechanisms**

Digging deeper into the mechanisms by which rejection affects restrictive eating elucidates just how differently self-esteem and self-compassion act as protective factors: Mediated moderation analyses revealed that self-esteem – or more precisely, the joint effect of self-esteem and self-compassion – moderates this pathway at the ‘front’ of the models – people high in self-esteem aren’t as affected, in terms of their affective response to the rejection, as those low in self-esteem. However, the relationship between negative affect and restrictive eating remained constant regardless of level of self-esteem. On the other hand, the common humanity/isolation component of self-compassion moderates the mediation pathway on the ‘back’ of the model – regardless of how strongly women see themselves within the broader context of common humanity (rather than in isolation), they were similarly affectively affected; however, only the less common humanity-focused women indicated that this negative affect lead to restrictive eating.

In other words, self-esteem buffers against the effects of rejection on eating because it buffers against sadness, shame and anxiety in the face of rejection. A sense of common humanity buffers against the effects of rejection on eating because it buffers against the negative effects of inevitable feelings of sadness, shame and anxiety in the face of rejection. This dovetails well with the very concept that sets self-compassion apart from self-esteem and similar self-enhancing attitudes: Self-compassion requires facing negative emotions head-on; confronting negative affect, recognising it, and coping with it in a more adaptive way (Neff, 2003a). So it makes sense that a component of self-compassion and self-esteem moderated the links between rejection, affect and restrictive eating in different places along the mediation pathway.

**Strengths, limitations and future directions**

The use of daily diary methodology has many strengths (Breines et al., 2014; Bolger, Davis, & Rafaeli, 2003), as it allows us to examine self-reported rejection and disordered eating as they are experienced in participants’ everyday lives. This reduces the potential for possible retrospective bias or demand characteristics that may occur in a laboratory setting, though does not entirely eliminate this potential; the timeframe for which participants reflect is potentially reduced, but not removed. Further, by examining self-compassion and self-esteem at the between-level, and daily self-report constructs at the within-level, we can account for low within-participant variability and observe significant moderating relationships of self-constructs on within-participant changes day to day. However, the results of this study should be qualified by certain limitations.
The findings are consistent with the hypothesis that rejection influences eating restriction through increasing negative affect, but other causal interpretations cannot be ruled out, given the cross-sectional nature of the analyses; While rejection, affect and eating were measured over several days, relationships between the variables are based on contemporaneous measures (within the same day).

Future research might address some of the limitations to this study. Experimental research is needed to examine whether inducing self-compassionate mindset, or high self-esteem, can reduce induced rejections’ effects on affect and eating. Furthermore, self-esteem and self-compassion are not the only ways of relating to oneself; the buffering potential of others self-focused constructs, such as spontaneous self-affirmation (Taber et al., 2016) which have been shown to buffer against health threats, could also be explored in the face of social threat, such as rejection. Body image flexibility may be another key individual-difference level moderator (Webb & Hardin, 2016) that could shape how shame impacts the social threat – affect – disordered/intuitive eating pathway particularly if the threat is weight- or appearance-related social rejection. Additionally, self-regulation and self-control offer another possible mediating mechanism to explain the relationship between rejection and eating (e.g. Baumeister et al., 2005; Beekman, 2016), so examining other mediators is another avenue of research that could be explored to elucidate this complex buffering relationship of positive self-attitudes on reactions and health outcomes related to rejection.

Though there was no clear evidence of biased responses, if socially-desirable responding or demand characteristics do occur in this type of research, physiological or other implicit measures of reactivity could not only reduce bias but could also further elucidate the mechanisms by which affective responses to social threat are impacted by self-compassion. For example, practicing self-compassion has been shown to cause measurable reductions in sympathetic activity and subjective anxiety responses, but not HPA axis activation as indexed by salivary cortisol responses to a social stress test (Arch et al., 2014), while a social-evaluative body image threat has been shown to elicit cortisol response (Lamarche, Gammage, Klentrou, Kerr, & Faulkner, 2014; Lamarche, Kerr, Faulkner, Gammage, & Klentrou, 2012). Understanding how these physiological measures interface with negative affect – beyond subjective anxiety – in the face of social threat, for people armed with a self-compassionate mindset, is an avenue for future research.

Finally, other forms of maladaptive eating in the face of rejection should be explored, such as overeating. Often over-eating is used as an experimental proxy for self-regulation in the face of rejection. Yet, given that 70% of individuals in the broader population are stress eaters rather than stress-restrictors (Epel et al., 2004), this is an important maladaptive eating behaviour to consider in addition to restrictive eating.

**Conclusion**

The present research is the first to explore how self-compassion and self-esteem differentially impact the complex impact that social rejection can have on negative affect and restrictive eating. Social rejection is part of the shared human experience. Findings suggest that we could all benefit from remembering this when we are rejected. Rejection hurts, and inspires shame and sadness, but no one is alone in these feelings, and remembering this common humanity can result in a healthier response to one of life’s most hurtful inevitabilities.
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Notes
1. Prior analyses not reported herein examined different facets of negative affect – individual components alone such as shame, sadness, etc. – all yielding similar results. This is potentially due to high correlation between affect dimensions. Regardless, preliminary and final analyses, in addition to rejection research that advocates for the impact of rejection a wider range of negative affects, led to the decision for a more global indicator that is both brief and represents different dimensions of negative affect.
2. When self-compassion was entered into the model as a covariate along with BMI, all rejection-affect moderation was no longer present.
3. When self-esteem was entered into the model as a covariate along with BMI, all rejection-affect moderation was no longer present.

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