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YPSILANTI, Antonia <http://orcid.org/0000-0003-1379-6215>, LAZURAS, Lambros <http://orcid.org/0000-0002-5075-9029>, POWELL, Phillip and OVERTON, Paul

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Self-disgust as a potential mechanism explaining the association between loneliness and depression

Antonia Ypsilanti*

Department of Psychology, Sociology & Politics, Sheffield Hallam University, UK

Lambros Lazuras

Department of Psychology, Sociology & Politics, Sheffield Hallam University, UK

Phillip Powell

School of Health and Related Research (ScHARR), University of Sheffield, UK

Department of Economics, University of Sheffield, UK

Paul Overton

Department of Psychology, University of Sheffield, UK

Correspondence address:

Dr Antonia Ypsilanti

Department of Psychology, Sociology & Politics

Sheffield Hallam University

M: A.Ypsilanti@shu.ac.uk

Abstract

Background: Loneliness and self-disgust have been considered as independent predictors of depressive symptoms. In the present study, we hypothesized that self-disgust can explain the association between loneliness and depression, and that emotion regulation strategies interact with self-disgust in predicting depressive symptoms.

Methods: Three hundred and seventeen participants (M = 29.29 years, SD = 14.11; 76.9% females) completed structured anonymous self-reported measures of loneliness, self-disgust, emotion regulation strategies, and depressive symptoms.

Results: One-way MANOVA showed that participants in the high-loneliness group reported significantly higher behavioural and physical self-disgust, compared to those in the middle and low-loneliness groups. Bootstrapped hierarchical linear regression analysis showed that self-disgust significantly improved predicted variance in depressive symptoms, after controlling for the effects of loneliness. Regression-based mediation modelling showed that both physical and behavioural self-disgust significantly mediated the association between loneliness and depression. Finally, moderated regression analysis showed that expressive suppression interacted with self-disgust in predicting depressive symptoms.

Limitations: A cross-sectional design was used, and our study focused on expressive suppression and cognitive reappraisal but not on other aspects of emotion regulation or the modulation of emotional arousal and responses.

Conclusions: We demonstrated, for the first time, that self-disgust plays an important role in the association between loneliness and depressive symptoms. Furthermore, variations in emotion regulation strategies can explain the association between self-disgust and depressive symptoms.

Keywords: self-disgust; depression; loneliness; expressive suppression.

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Introduction

Depression is the leading cause of disability and one of the most common mental health problems worldwide (World Health Organization [WHO], 2017). More than 300 million people of all ages are currently living with depression, with a sharp increase in prevalence of over 18% from 2005 to 2015. At its worst, depression can become lethal, particularly in young adults (15-29 years) as more than 800.000 people die each year from suicidal depression, and from depression-related cardiovascular disease (Nemeroff & Goldschmidt, 2012; WHO, 2017). Understanding the factors that trigger depressive symptoms and lead to clinical states of depression is important for informing theories of depression, as well as clinical practice and treatment. Research has shown that, amongst other antecedents, risk factors for depression include psychological characteristics, such as perceived loneliness/social isolation (e.g., Cacioppo, Hawkley & Thisted, 2010), self-blaming emotions (Zahn et al., 2015), and maladaptive emotion regulation strategies (Joormann & Gotlib, 2010). Although these factors have been independently associated with depression, it remains unknown how they are interrelated with depressive symptomatology.

Loneliness as a Risk Factor for Depression

Loneliness is defined as the perceived discrepancy between a person's social needs and the degree to which these needs are satisfied through meaningful social interactions (Cacioppo & Hawkley, 2009; Rokach 2011). Approximately 15-30% of the general population experience feelings of loneliness as a chronic condition (Heinrich & Gullone, 2006) with considerable consequences for physical and psychological wellbeing. Longitudinal data indicate that loneliness predicts morbidity and mortality across different

age groups (Caspi, Harrington, Moffitt, Milne, & Poulton, 2006; Eaker, Pinsky & Castelli, 1992; Hawkley et al., 2003; Penninx et al., 1997; Thurston Kubzansky, 2009). Moreover, loneliness has been associated with psychological disorders including depression (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Cacioppo et al., 2010; Luo, Hawkley, Waite, & Cacioppo, 2012; Neeleman & Power, 1994; Weeks et al., 1980). Although loneliness and depression were once thought to reflect the same psychological condition (Peplau & Perlman, 1979; Weiss, 1973), evidence (Weeks et al., 1980) showed that loneliness and depression were psychometrically distinct but correlated constructs; they were both stable over time; and that they may share some common causal origins (e.g., salience of personal problems). Longitudinal studies have demonstrated that loneliness is a risk factor for depressive symptoms over and above differences in age and gender, life stressors, negative affectivity, and social support in young and older adults (Cacioppo et al., 2010; Luo et al., 2012), and that childhood loneliness is a prospective risk factor for depressive symptoms in adolescence (Qualter, Brown, Munn, & Rotenberg, 2010). In fact, loneliness has been found to predict depressive symptoms longitudinally even after controlling for baseline measures of depressive symptoms and socio-demographic factors in both older (Cacioppo et al., 2006) and younger adults (Wei, Russell, & Zakalik, 2005), but loneliness was not found to longitudinally predict depressive symptoms (Cacioppo et al., 2010).

Several studies have shown that feeling socially isolated induces negative affective states characterized by hypervigilance and attentional bias towards threatening stimuli, and the tendency to misperceive social encounters as threatening to the self (i.e., social threats; Cacioppo, Balogh & Cacioppo, 2015; Cacioppo & Hawkley, 2009; Hawkley & Cacioppo, 2010). Brain imaging studies have also shown that individuals with higher loneliness scores perceive and remember social information as more threatening, as compared to non-social stimuli (e.g., Cacioppo et al., 2009; Cacioppo, Cacioppo & Boomsma, 2014). Cacioppo and

colleagues (Cacioppo et al., 2006; Cacioppo et al., 2015) suggested that, if left untreated, the effects of loneliness on cognition and emotion progressively lead to greater social withdrawal and isolation, contributing to the development of negative thoughts (e.g., rumination) towards social interactions, and potentially lead to the development of depressive symptoms.

Evidence has particularly supported the notion that lonelier individuals experience negative thoughts and feelings towards themselves, characterized by self-blame, low self-worth, dysphoria, and lower self-esteem, which then feed into greater loneliness, social isolation, and mental health problems including depression (Cacioppo et al., 2006; Masi, Chen, Hawkley, & Cacioppo, 2011). In support of this argument, Beck (1967) suggested that negative evaluations of the self were core to the development of depressive symptomatology (Beck, 1967). Barry (1962) also discussed depression as "a delusional idealisation regarding the worth of the self, marked by self-loathing" (p. 582), but there was little empirical support for this argument at the time. In more recent studies, loneliness has been said to lead to depression by eliciting self-focused negative emotions. In particular, Heinrich and Gullone (2006) discussed the affective features of loneliness and showed that self-deprecation, negative attitudes towards the self, and negative self-conscious affective states were common among individuals with higher loneliness scores.

Self-disgust and Depression

Self-disgust is a negative self-conscious emotion schema that reflects disgust directed towards the self (physical self-disgust; e.g., "*I find myself repulsive*") or towards one's actions (behavioural self-disgust; e.g., "*I often do things I find revolting*"; Overton, Markland, Taggart, Bagshaw, & Simpson, 2008). Self-disgust has been associated with several mental disorders and related symptoms, including social anxiety (e.g., Amir, Najmi, Bomyea, & Burns, 2010), eating disorders (Fox, 2009), obsessive-compulsive disorder (Olatunji et al.,

2015), and psychoticism (Ille et al 2014), and with reduced psychological well-being (Azlan, Overton, Simpson, & Powell, 2017; Brake, Rojas, Badour, Dutton, & Feldner, 2017).

Power and Dalgeish (2008) argued that self-disgust contributes to the genesis of depressive symptomatology. Different studies confirmed this hypothesis by showing that self-disgust mediated the association between dysfunctional thoughts and depressive symptoms in cross-sectional and cross-lagged longitudinal studies (Overton, Markland, Taggart, Bagshaw, & Simpson, 2008; Powell et al., 2013; Simpson, Hillman, Crawford, & Overton, 2010). Another study found that self-disgust was more commonly reported than shame and guilt among individuals diagnosed with major depressive disorder (Zahn et al., 2015).

Given that loneliness and self-disgust appear are independently associated with the development of depressive symptoms both cross-sectionally and longitudinally (see Cacioppo et al., 2006; 2010; Overton et al., 2008; Powell et al., 2013), and assuming that loneliness elicits negative thoughts and aversive self-conscious feelings, such as low self-worth and self-loathing (e.g., Heinrich & Gullone, 2006), then it is sensible to argue that lonelier individuals may also experience more self-disgust as compared to less lonely ones. Furthermore, loneliness is said to induce negative thoughts about the self that perpetuate into ruminations and, eventually, lead to depressive symptoms (Vanhalst, Luyckx, Raes, & Goossens, 2012; Zawadzki, Graham, & Grein, 2013), one of which encompasses self-disgust (i.e., "*I am disgusted with myself*") when depressive symptomatology is measured with Beck's depression inventory (Beck et al., 1961). Moreover, Overton et al. (2008) suggest that ruminations and negative thoughts precede self-disgust experiences, and self-disgust (and lower self-esteem) mediate the association between negative thoughts and depressive symptoms (see also Simpson et al., 2010). In light of this evidence, it is plausible that loneliness precedes the experience of self-disgust, and that self-disgust mediates the

association between loneliness and depressive symptoms. Still, no study has yet addressed the association between loneliness and self-disgust, and their interrelationship in predicting depressive symptoms.

Emotion Regulation and Depression

Emotion regulation is defined as automatic or controlled processes that people use to reach a goal (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Gross, 2013; Webb, Gallo, Miles, Gollwitzer & Sheeran, 2012) by increasing (up-regulation) or decreasing (down-regulation) the magnitude or the duration of their emotional responses (Gross, 2013). Gross and Thomson (2007) suggested that emotion regulation can happen before or after an emotional response and that cognitive reappraisal and expressive suppression represent two distinct emotion regulation strategies. Cognitive reappraisal is an antecedent-focused strategy (i.e., happens before the emotional response) and involves the cognitive re-interpretation of events to alter the emotional response and reduce its impact. Suppression is a response-focused strategy (i.e., happens after the emotional response) that helps regulate or inhibit a negative emotional response by actively suppressing it (Gross, 2013; 2015). At a social level, suppression has been associated lower liking ratings from others (Butler, Egloff, Wilhelm, Smith, & Erickson, 2003; Gross & John, 2003), while at an affective level, expressive suppression decreases positive emotional experiences and leaves negative ones unchanged (Gross & John, 2003; Gross & Thompson, 2007). Finally, expressive suppression has been positively associated with higher scores in mental health symptoms, such as anxiety, PTSD, and depression (Moore, Zoellner, & Mollenholt, 2008). Joormann and Gotlib (2010) found that individuals with depression and formerly depressed individuals both exhibited more rumination, less inhibition for negative stimuli and greater use of expressive suppression strategies, and suggested that depression can be explained as a disorder of emotion dysregulation characterized by the inability to inhibit negative thoughts and feelings. Another

study found that cognitive reappraisal moderated the effects of higher stress scores in depressive symptoms, and it was suggested that cognitive reappraisal may act protectively against depression (Troy, Wilhelm, Shallcross, & Mauss, 2010). Ehring and colleagues (2010) suggested that individuals, which were more vulnerable to depression (i.e., had experienced at least one episode of depression in the past) used emotion suppression more frequently than non-vulnerable individuals, when exposed to a sadness-inducing film. Considering the association between emotion regulation strategies and depression, and taking into account that self-disgust involves a long term affective appraisal of the self (or its actions; Powell et al., 2015) that plays a role in the genesis of depressive symptoms (Overton et al., 2008; Powell et al., 2013; Simpson et al., 2010), then it is theoretically plausible that emotion regulation strategies can influence the association between self-disgust and depressive symptoms. However, this hypothesis has not been empirically investigated as yet. In the present study, we examined two emotion regulation strategies namely, emotion suppression and reappraisal that have previously been implicated in depressive symptomatology and depression-vulnerability (Ehring et al., 2010; Gross & Munoz, 1995; Joormann & Gotlib, 2010).

The Present Study

Independent studies using both cross-sectional and longitudinal designs have shown that loneliness and self-disgust represent distinct risk factors for the development of subsequent depressive symptoms (Cacioppo et al., 2006; Cacioppo et al., 2010; Luo et al., 2012). Furthermore, loneliness elicits negative self-conscious affective states, including self-deprecation, self-loathing, low self-worth, lower self-esteem and overall negative attitudes towards oneself, which contribute to the development of ruminations and depressive symptoms (Cacioppo et al., 2006; Heinrich & Gullone, 2006; Masi et al., 2011; Pritchard & Yalch, 2009). Self-disgust, on the other hand, mediates the association between negative

thoughts (about the self) and depressive symptoms (Overton et al., 2008; Simpson et al., 2010). So far, however, no study has assessed the association between loneliness and self-disgust, nor the association between loneliness and depression after accounting for the effects of self-disgust.

In the present study, we hypothesized that if loneliness induces feelings of low self-worth, then it can potentially contribute to the development of self-disgust. In that sense, it was anticipated that individuals with higher loneliness scores will report significantly more self-disgust than individuals with lower loneliness scores (Hypothesis 1). As an affective antecedent of depression, self-disgust will be positively associated with depression and loneliness, and predict depressive symptoms over and above the effects of loneliness (Hypothesis 2). Additionally, if loneliness contributes to the development of depressive symptoms through negative thoughts and feelings about the self, then self-disgust may potentially explain the association between loneliness and depression. Therefore, we hypothesized that self-disgust will significantly mediate the association between loneliness and depressive symptoms (Hypothesis 3). Considering the link between emotion regulation strategies and depression (e.g., Gross & Muñoz, 1995; Moore et al., 2008), and taking into account that self-disgust involves a persistent negative evaluation of the self (or its actions; Powell et al., 2015), then it is theoretically plausible that expressive suppression (positively) and cognitive reappraisal (negatively) will be associated with self-disgust (Hypothesis 4). Finally, if cognitive reappraisal attenuates adverse affective experiences, and expressive suppression fails to undo the affective imprint of negative emotional states (Gross & John, 2003), then is hypothesized that emotion regulation strategies will moderate the association between self-disgust and depression (Hypothesis 5).

Methods

Participants

Overall, 452 undergraduate and postgraduate university students, working staff, and visitors (i.e., community members who visited the University campus on Open Days) in large Universities in South Yorkshire, England were approached and agreed to take part in the study and, of them, 317 cases were completed and eligible for analysis in the present study (final response rate = 70.1%). Only complete cases were used in the analyses due to the ethical right to withdraw from the survey at any time. Participants were aged between 18 and 72 years ($M = 29.29$, $SD = 14.11$), 76.9% were females, and 78% had a British background. The research was carried out in accordance with the Code of Human Research Ethics of the British Psychological Society, and participants were provided with consent forms to complete, and were duly informed about their participation rights (i.e., voluntary and anonymous participation; no penalties for withdrawing from the study at any stage without notice).

Measures

Demographics.

Demographic characteristics were assessed with open-ended questions asking participants to indicate their age (i.e., how old are you?), gender, and nationality.

Loneliness.

The University of California Loneliness Scale (UCLA) was used in the present study (Russell, Peplau, & Ferguson, 1978) as a measure of loneliness, which consists of 20 items (e.g., "*I am unhappy doing so many things alone*", "*I feel completely alone*", and "*I feel isolated from others*") rated on a 4-point scale of (1 = *never*, 4 = *often*). Loneliness scores are calculated by summing the items (after reverse scoring) and ranged from 20-80, with higher scores indicating increased loneliness levels. Cronbach's alpha was $\alpha = .95$.

Depression.

Depressive symptomatology was measured using the Beck's Depression Inventory (Beck et al., 1961), which measures characteristic attitudes and symptoms of depression and consists of 21 self-report items (e.g., "*I feel sad*", "*I feel discouraged about the future*", "*I feel guilty all the time*", and "*I am disgusted with myself*") rated on a 4-point scale (0-3, with variable anchors) giving a total score maximum of 63. Internal consistency for the BDI ranges from .73 to .92 with a mean of .86 (Beck, Steer, & Garbin, 1988) and in the present study Cronbach's alpha was $\alpha = .89$.

Emotion regulation.

Emotion regulation was measured with the Emotion Regulation Questionnaire (ERQ; Gross & John, 2013). The ERQ is a 10-item measure that assesses individual differences in emotion regulation strategies. It consists of two sub-scales that reflect expressive suppression (e.g., "*I control my emotions by not expressing them*") and cognitive reappraisal (e.g., "*When I want to feel positive emotion (such as joy or amusement), I change what I'm thinking about*"). Responses are given on 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). A mean score is computed for each scale and higher scores indicate higher emotion regulation. The reliability and validity of the ERQ have been reported in previous studies (Gross & John, 2003). In the present study the internal consistency reliability for the ERQ sub-scales was high (cognitive reappraisal $\alpha = .86$; expressive suppression $\alpha = .76$).

Self-disgust.

Self-disgust was assessed with the Self-Disgust Scale (SDS; Overton et al., 2008), an 18-item measure reflecting disgust and repulsion directed to the self. Six items are filler items (e.g., "*I enjoy the company of others*") and 12 items reflect self-disgust towards the self (e.g.,

"*I find myself repulsive*"), and towards one's behaviour/actions (e.g., "*I often do things I find revolting*"). Responses are coded on a 7-point Likert scale (1 = *strongly agree*, 7 = *strongly disagree*), and, after reverse scoring 9 items, a total sum score is computed. Higher scores indicate higher levels of self-disgust. Self-disgust is reflected in the total sum score, as well as in the sub-scales of "disgusting self" (or physical self-disgust, which reflects disgust towards more enduring characteristics of the self) and "disgusting ways" (or behavioural self-disgust, which reflects disgust towards one's own behaviour and actions), and the reliability and validity of this measure has been reported elsewhere (Overton et al., 2008). In the present study, the internal consistency was acceptable for the total self-disgust scale ($\alpha = .90$), and the subscales of behavioural ($\alpha = .86$) and physical self-disgust ($\alpha = .84$).

Design/Procedure

A cross-sectional, correlational, survey-based design was used to measure the associations between demographic characteristics (age, gender, and nationality), self-disgust, depressive symptomatology, loneliness, and emotion regulation. Participants were recruited either from the host university or convenience sampled from the general population and asked to complete an online survey (hosted on Qualtrics, www.qualtrics.com). Only participants who completed all study measures were included in this study, all other data were discarded. No time restrictions were applied and survey completion required approximately 15-20 minutes.

Data Analysis

Multivariate analysis of variance was used to compare the differences in self-disgust scores between high and low loneliness groups (see below for definitions). Pearson's *r* correlations were used to explore initial associations in the data, followed by a bootstrapped hierarchical linear regression analysis of the hypothesised relationships between the

constructs. Bootstrapping is a robust alternative to standard parametric estimates, when the assumptions around the latter may be violated (Fox, 2015). Regression-based multiple mediation analysis (Hayes, 2013; Preacher & Hayes, 2008) was used to assess the mediating effect of self-disgust on the association between loneliness and depressive symptoms. Finally, moderated regression analysis was used to assess the interaction between emotion regulation strategies and self-disgust in predicting depressive symptoms. All data were analysed in SPSS v. 22 (IBM Corp., Armonk, NT, USA).

Results

Differences in Self-Disgust between Loneliness Groups

In order to test hypothesis 1, loneliness groups were determined using Cacioppo's approach (Cacioppo et al., 2002; Cacioppo et al., 2000) by selecting participants based on the UCLA to be among the upper (lonely group: total score $\geq$ 33), middle (middle loneliness group: total score $\geq$ 14 and $\leq$ 21) or lower (non-lonely group: total score $\leq$ 5) quintile of the distribution. Given the correlations between the two self-disgust scores (physical self-disgust and behavioural self-disgust) we performed a one-way MANOVA to explore group differences on each dependent variable. Our results indicated a significant main effect for group on total self-disgust score, $F(2,181) = 99.84$, $p = 0.000$, partial $\eta^2 = 0.525$, physical self-disgust, $F(2,181) = 84.57$, $p = 0.000$, partial $\eta^2 = 0.483$, and behavioural self-disgust, $F(2,181) = 64.18$, $p = 0.000$, partial $\eta^2 = 0.415$. Post-hoc (Bonferroni) comparisons indicated significant group differences on all measures of self-disgust among the three loneliness groups (see Table 1).

Correlation between Loneliness, Self-Disgust, and Depressive Symptoms

Correlation analysis showed that depressive symptoms were positively and significantly correlated with loneliness ($r = .64$, $p < .001$), and both physical self-disgust ($r = .67$, $p < .001$) and behavioural self-disgust ($r = .64$, $p < .001$), and the observed effect sizes denoted large correlations according to Cohen (1992). Small to moderate significant positive correlations (rs ~ .13 to .26) were observed between depressive symptoms and emotion regulation strategies, and gender. There was a significant negative correlation between cognitive reappraisal and depressive symptoms ($r = -.28$, $p < .005$), showing that higher cognitive reappraisal scores are associated with less depressive symptoms. The results from the correlation analysis are presented in Table 2.

Association of Loneliness, Emotion Regulation & Self-Disgust with Depressive Symptoms

A bootstrapped hierarchical regression analysis with 5000 resamples and 95% confidence intervals (CIs) was used to test the second hypothesis of the study, that is, self-disgust will predict depressive symptoms, over and above the effects of loneliness and emotion regulation. The analysis was completed in three steps and the overall model predicted 55% (Adjusted $R^2 = 53.8$) of the variance in depressive symptoms - a large multivariate effect size according to Cohen (1992). The first step of the analysis included demographic characteristics (age, gender) and loneliness, and gender and loneliness significantly predicted depressive symptoms, accounting for 37.3% of the variance. Emotion regulation strategies (i.e., cognitive reappraisal and expressive suppression) were added in the second step of the analysis and significantly increased the predicted variance in depressive symptoms by 2.7% ($F_{change} = 5.84$, $p = .003$). Both expressive suppression and cognitive reappraisal had a significant effect on depressive symptoms. The two dimensions of self-disgust (i.e., physical and behavioural self-disgust) were added in the final step of the analysis, and significantly increased the predicted variance in depressive symptoms ($\Delta R^2 = $

15%, $F_{change} = 42.12$, $p < .001$). In this model, self-disgust and loneliness were significant predictors, the effect of cognitive reappraisal was non-significant, and the effect of expressive suppression marginally significant ($p = .049$). The full findings from the regression analysis are presented in Table 3.

Indirect Association of Loneliness on Depressive Symptoms

Multiple mediation modelling was used to assess the mediating role of self-disgust in the association between loneliness and depressive symptoms. For the analysis we used the SPSS Macro INDIRECT (Preacher & Hayes, 2008) with 5000 resamples and 95% confidence intervals, and the Sobel test (z) was used to enable effect size comparisons between the mediators. The results showed that both physical self-disgust ($z = 5.64$, $p < .001$) and behavioural self-disgust ($z = 4.06$, $p < .001$) significantly mediated the association between loneliness and depressive symptoms, and the effect sizes of the mediators did not differ significantly (Table 4).

Interaction between Emotion Regulation and Self-Disgust

Moderated regression analysis was used to assess if emotion regulation strategies moderated the association between self-disgust and depressive symptoms. Four models were computed to respectively assess the interactions between expressive suppression and behavioural self-disgust; expressive suppression and physical self-disgust; cognitive reappraisal and behavioural self-disgust; and cognitive reappraisal and physical self-disgust in predicting depressive symptoms. Following the recommendations by Cohen, Cohen, Aiken, and West (2013) the predictor variables were mean-centred to avoid multicollinearity, and an interaction term was computed to denote their interaction (emotion regulation strategy × self-disgust). The analyses were completed in two steps, with the first step including the

main effects, and the second step including the interaction term. Unstandardized beta weights

(B) and 95% confidence intervals (CIs) were used.

The analyses showed that expressive suppression significantly moderated the

association between physical self-disgust and depressive symptoms (B $_{\text{self-disgust} \times \text{expressive}}$

$_{\text{suppression}}$ = .095, β = .094, p = .037, 95% CI for B = .006 to .184), showing that the association

between physical self-disgust and depressive symptoms is stronger when expressive

suppression scores are higher (Figure 1). No other significant interactions were observed.

Discussion

The present study investigated, for the first time, the differences in self-disgust

experiences between individuals with different loneliness scores. We also assessed the

additive effect of self-disgust in predicting depression, after controlling for the effects of

loneliness, as well as the mediating role of self-disgust in the association between loneliness

and depression. We hypothesized that people with higher loneliness scores would display

significant differences in self-disgust as compared to individuals with lower loneliness scores.

We also anticipated that self-disgust would be positively associated with both loneliness and

depression, and also mediate the association between these two variables. Our results

supported these hypotheses. In particular, by utilizing Cacioppo et al.'s (2002) approach for

distinguishing between high, middle, and low-loneliness groups, we found that participants

on the lower end of the loneliness scale reported significantly less self-disgust than those in

the middle and the higher end, thus suggesting a clear linear effect (i.e., high loneliness is

associated with higher self-disgust). Furthermore, regression analyses showed that both

behavioural and physical self-disgust were positively associated with loneliness and

depression. Moreover, in support of our second hypotheses, self-disgust predicted depression

over and above the effects of loneliness and other variables (i.e., emotion regulation and

demographic variables) by adding 15% in explained variance to the model. Lastly, in support of our third hypothesis, self-disgust significantly mediated the association between loneliness and depressive symptomatology.

Our findings are in line with, and further extend previous research that demonstrated an association between loneliness and negative self-conscious affective states, such as low self-worth, and self-loathing (e.g., Cacioppo et al., 2006; Cavazos et al., 2017; Pritchard & Yalch, 2009). In particular, our results extend previous research by showing that loneliness differentiates the experience of self-disgust in a linear fashion (lower loneliness groups experience lower self-disgust, as compared to middle and higher loneliness groups). Moreover, loneliness was found to be associated with self-disgust, which is a distinct self-conscious and persistent negative emotion schema that is characterized by repulsion towards the self (physical disgust) and towards one's actions (behavioural disgust). Previous research indicated that self-disgust is a potential antecedent of depressive symptomatology, and a mediator of the association between dysfunctional thoughts and depressive symptoms (Overton, et al., 2008; Simpson et al., 2010). In view of our findings, and taking into account previous research that addressed the self-conscious negative affective aspects of loneliness (for a review see Heinrich & Gullone, 2006), we suggest that self-disgust may represent an affective mechanism through which loneliness progresses to the development of depressive symptoms. Of course, causality cannot be assumed because we used a cross-sectional design. However, previous research using longitudinal designs showed that both loneliness and self-disgust typically precede the development of depressive symptoms, rather than the reverse (e.g., Cacioppo et al., 2010; Powell et al., 2013).

We also hypothesized that emotion regulation strategies would be associated with self-disgust, and that they would moderate the relationship between self-disgust and depressive symptoms. In particular, our fifth hypothesis predicted that emotion regulation

strategies would moderate the association between loneliness and depressive symptoms. Our findings partly supported these hypotheses by showing that both expressive suppression (positively) and cognitive reappraisal (negatively) were correlated with self-disgust. However, only expressive suppression moderated the association between self-disgust and depression, so that individuals with higher self-disgust scores experienced more depressive symptoms when expressive suppression was high. These findings are in line with Gross and Thompson (2007) who suggested that expressive suppression is a response-focused strategy that cannot sufficiently modify adverse emotional experiences, and thus, does not alleviate the emotional burden of negative affective states. On the basis of our findings, we further suggest that expressive suppression is ineffective in reducing self-conscious negative affect (e.g., self-disgust), and that it strengthens the association between self-disgust and depression. Furthermore, previous research showed that expressive suppression was positively associated with higher scores in depression (Moore et al., 2008), and cognitive reappraisal was negatively associated with depression (Troy et al., 2010). A similar pattern of results was found in the present study, but the effect sizes of the observed bivariate correlations between depression and emotion regulation strategies were moderate (rs ~ -0.28, 0.13) and the predictive effect of cognitive reappraisal on depressive symptoms became non-significant when self-disgust was taken into account.

To summarize, we demonstrated that self-disgust is higher among individuals with higher loneliness scores, and that self-disgust can explain the association between loneliness and depression. We also provided evidence that maladaptive emotion regulation strategies, such as expressive suppression, strengthen the association between self-disgust and depressive symptoms. To the best of our knowledge, no previous research has assessed the additive and mediating role of self-disgust in the relationship between loneliness and

depression, nor has any study examined how emotion regulation strategies influence the association between self-disgust and depressive symptoms.

Limitations

Our study is not free of limitations. First of all, a cross-sectional design was used and this limits our ability to make causal inferences about the association between loneliness, self-disgust, and depression. It is possible that depression can also lead to greater loneliness, and that self-disgusted individuals experience greater loneliness (because of social withdrawal), which then leads to depressive symptoms. It is also possible that self-disgust enhances feelings of loneliness over time; therefore, the synergistic effects of loneliness and self-disgust on depression can be more intriguing than we hypothesized in the present cross-sectional study. Longitudinal research is needed to delineate the temporal causality of these associations, and to more particularly examine when loneliness and self-disgust develop, and how their temporal interrelationships contribute to the genesis of depressive symptoms. Future studies may also assess the association between loneliness, self-disgust, and emotion regulation in clinical populations and observe how these associations unfold over time and predict mental health (and even) treatment outcomes. Secondly, our study was too narrowly focused on expressive suppression and cognitive reappraisal and did not control for other aspects of emotion regulation or the modulation of emotional arousal and responses, such as emotional awareness and understanding (e.g., Gratz & Roemer, 2004). Perhaps a broader assessment of emotion regulation strategies would have yielded different results about the role of emotion regulation in the association between self-disgust and depressive symptoms. Finally, our sample consisted predominantly of female participants, and mostly university students and staff (academics and non-academics). Our findings can be potentially generalized to the university student population that is at high risk for depression (Hill, Yaroslavsky, & Pettit, 2015; Ibrahim, Kelly, Adams, & Glazebrook, 2013).

Implications for clinical practice

In light of our findings we propose that self-disgust experiences can play an important role in the development of depressive symptomatology in lonely individuals. Thus far, cognitive interventions, targeted at increasing social support, enhancing social skills and addressing maladaptive thoughts in the context of social interactions seen as threatening, are used to alleviate loneliness (Cattan, White, Bond, & Learmouth, 2005; Masi, Chen, Hawkley, & Cacioppo, 2011). We propose that therapeutic interventions and clinical practice that aims to reduce the detrimental effects of loneliness on mental health, also consider the role of maladaptive self-conscious affect, such as self-disgust, in the genesis of subsequent depressive symptomatology. One way of achieving this goal is through mindfulness. In particular, studies have shown mindfulness-based interventions have been associated with reduced mental health problems, including depression, and with less ruminating thoughts and negative affect in both healthy and clinical populations (Chambers, Yee Lo, & Allen, 2008; van der Velden et al., 2015; Wang et al., 2018). Accordingly, neuroimaging research has shown that dispositional mindfulness was associated with greater regulation of negative affect through the prefrontal cortex (PFC), thus, suggesting that mindfulness can buffer the neuro-modulation of negative affect in the amygdala and enhance negative affect regulation through PFC activation (Creswell, Way, Eisenberger, & Lieberman, 2007). Although the association between self-disgust and mindfulness has not been empirically assessed as yet, it is theoretically plausible that mindfulness-based interventions can reduce the effects of self-disgust on depressive symptoms, and future research should address this effect. Secondly, compassion-focused therapy can provide another promising way to alleviate feelings of self-disgust, and accordingly reduce its effects on depressive symptoms. Gilbert (2015) argued that self-disgust is based on extremely negative self-evaluations and self-contempt, and allowing people to contextualize their self-evaluations by considering their possible selves

and the ones they would like to further cultivate can reduce self-directed negative affect, such as self-hatred and self-disgust. Nevertheless, this is a theoretical speculation and future research using randomized clinical trials should examine if mindfulness and/or compassion-based interventions are effective in reducing self-disgust and, accordingly, buffer the effects of self-disgust on depressive symptoms.

Another promising area for interventions to reduce self-disgust comes from self-affirmation theory. The main tenet of the theory is that people respond defensively (e.g., engage in message denigration, downplay the risks) to any information that potentially threatens their self-concept, and their subjective sense of self-integrity and moral adequacy (e.g., smokers denigrating health messages that remind them how tobacco use harms their health; Cohen & Sherman, 2014; Sherman & Cohen, 2006). By allowing people to self-affirm (e.g., letting them reflect on their virtues or traits) researchers can effectively reduce defensive processing of the "threatening" information and accordingly facilitate message acceptance and enable behaviour change (Cohen & Sherman, 2014; Steele, 1998). A large body of research in social, educational, and health psychology has demonstrated that self-affirmation interventions can reduce defensive processing and enhance message acceptance, increase motivation to change, and lead to actual behaviour change (Cohen & Sherman, 2014; Epton, Harris, Kane, & van Koningsbruggen, 2015). In the context of body image impairments, Powell, Simpson, and Overton (2015) showed that individuals with body image impairments displayed higher levels of physical self-disgust, and that a single self-affirmation intervention significantly reduced self-disgust experiences, as compared to participants with body image impairments who did not receive the intervention. Stemming from these findings, we suggest that self-affirmation interventions could potentially reduce self-disgust feelings among individuals with higher loneliness scores, and accordingly reduce their risk for depressive symptoms. Nevertheless, this is an assumption that should be empirically

investigated by future studies. Furthermore, university students are at high risk for depression (e.g., Ibrahim et al., 2013) and researchers have called for further research in enhancing depression screening for this population (e.g., Hill et al., 2015). Our results suggest that self-disgust and loneliness measures could be potentially incorporated in depression screening, and this may help university-based mental health services identify students at risk for depression.

The present findings also indicated that targeting emotion regulation strategies in the context of university mental health services and student support can prove effective in young adults with depressive symptomatology. More specifically, we found that expressive suppression significantly moderated the relationship between self-disgust and depressive symptoms, so that the association between self-disgust and depressive symptoms was stronger among individuals who tended to used expressive suppression. Refraining from the use of maladaptive emotion regulation strategies, such as expressive suppression, can be particularly helpful for individuals who have higher scores in self-disgust and, possibly, are at higher risk for depression.

Table 1.

Differences in Self-Disgust Scores between Loneliness Groups

	Non-lonely		Middle Loneliness		Lonely	
	M	*SD*	*M*	*SD*	*M*	*SD*
Total self-disgust	23.09	6.92	33.66	10.31	46.90	10.51
Behavioural self-disgust	9.26	3.65	12.76	4.86	18.96	5.33
Physical self-disgust	9.54	3.13	15.58	5.44	20.93	5.64

Table 2.

Correlations between Depressive Symptoms, Loneliness, Self-Disgust, and Emotion Regulation Strategies

	1	2	3	4	5	6	7	8
1. Depressive symptoms	-	.64**	.67**	.64**	.26**	-.28**	.13*	.02
2. Loneliness		-	.63**	.61**	.28**	-.31**	.07	.00
3. Self-disgust (physical)			-	.67**	.22**	-.37**	.11*	-.09
4. Self-disgust (behavioural)				-	.27**	-.38**	-.03	-.16*
5. Expressive suppression					-	.03	-.26**	-.08
6. Cognitive reappraisal						-	-.15*	.04
7. Gender[†]							-	.00
8. Age								-
M	11.38	19.62	15.17	13.79	3.89	4.74	1.77	29.29
SD	8.74	14.22	6.43	5.77	1.27	1.09	0.42	14.11
Cronbach's α	0.89	0.95	0.86	0.84	0.76	0.86	-	-

Note. *p ≤ .05; **p≤ .005; ***p≤ .001; [†] Point-biserial correlations are reported for gender.

Table 3

Direct Effects of Self-Disgust on Depressive Symptoms

Step	Predictors	B	β	95% CI for B	R^2
1	Age	-.013	-.022	-.069 – .044	37.3%
	Gender	2.587	.127*	.593 – 4.581	
	Loneliness	.355	.588***	.296 – .414	
2	Age	-.003	-.006	-.059 – .052	40.1%
	Gender	3.221	.158**	1.162 – 5.280	
	Loneliness	.307	.509***	.243 – .371	
	Expressive suppression	1.049	.160**	.358 – 1.741	
	Cognitive reappraisal	-.780	-.102*	-1.561 – .001	
3	Age	.041	.070	-.009 – .090	55%
	Gender	2.269	.111*	.455 – 4.082	
	Loneliness	.125	.208***	.057 – .193	
	Expressive suppression	.619	.094*	. 009 – 1.228	
	Cognitive reappraisal	.159	.021	-.551 – .870	
	Self-disgust (physical)	.499	.376***	.333 – .665	

Self-disgust (behavioural)	.349	.224***	.155 – .542

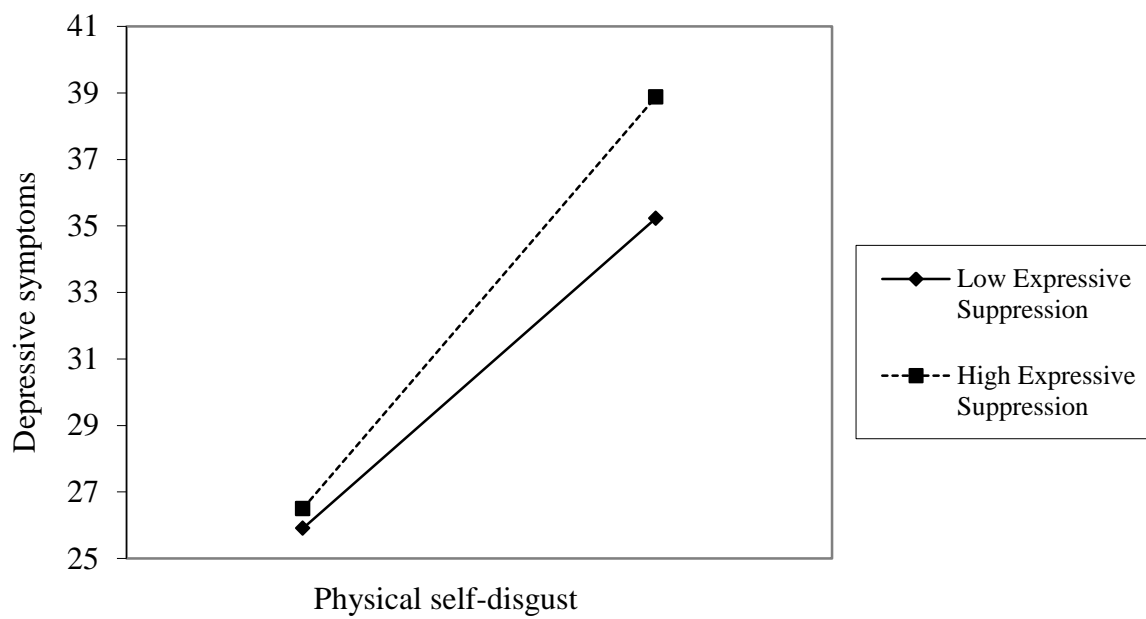*Note.* *p ≤ .05; **p≤ .005; ***p≤ .001.

Table 4.

Indirect Effects of Loneliness on Depressive Symptoms

	Product of Coefficient			Bias Corrected 95% CIs	
	Parameter	SE	z	Lower	Upper
Mediator	Estimate (B)				
Loneliness and Depressive Symptoms					
Total effect	0.227	0.026	8.699*	0.169	0.284
Self-disgust (physical)	0.137	0.024	5.644*	0.083	0.193
Self-disgust (behavioural)	0.089	0.022	4.064*	0.045	0.136

Note. *$p < .001$

Figure 1. Interaction between physical self-disgust and expressive suppression.

References

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217-237.

Amir, N., Najmi, S., Bomyea, J., & Burns, M. (2010). Disgust and anger in social anxiety. *International Journal of Cognitive Therapy*, *3*(1), 3-10.

Armstrong, T., & Olatunji, B. O. (2012). Eye tracking of attention in the affective disorders: A meta-analytic review and synthesis. *Clinical Psychology Review*, *32*(8), 704-723.

Azlan, H. A., Overton, P. G., Simpson, J., & Powell, P. A. (2017). Effect of partners' disgust responses on psychological wellbeing in cancer patients. *Journal of Clinical Psychology in Medical Settings*, 1-10.

Barry Jr, M. J. (1962). Depression, shame, loneliness, and the psychiatrist's position. *American Journal of Psychotherapy*, *16*, 580-590.

Beck, A. T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. University of Pennsylvania Press

Beck, A.T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961) An inventory for measuring depression. *Archives of General Psychiatry,* 4, 561-571.

Brake, C. A., Rojas, S. M., Badour, C. L., Dutton, C. E., & Feldner, M. T. (2017). Self-disgust as a potential mechanism underlying the association between PTSD and suicide risk. *Journal of Anxiety Disorders*, *47*, 1-9.

Butler, E. A., Egloff, B., Wlhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion*, *3*(1), 48.

Cacioppo, S., Balogh, S., & Cacioppo, J. T. (2015). Implicit attention to negative social, in contrast to nonsocial, words in the Stroop task differs between individuals high and low in loneliness: evidence from event-related brain microstates. *Cortex*, *70*, 213-233.

Cacioppo, J. T., Cacioppo, S., & Boomsma, D. I. (2014). Evolutionary mechanisms for loneliness. *Cognition & emotion*, *28*(1), 3-21.

Cacioppo, J. T., Ernst, J. M., Burleson, M. H., et al. (2000). Lonely traits and concomitant physiological processes: the MacArthur social neuroscience studies. *International Journal of Psychophysiology*, *35*(2), 143-154.

Cacioppo, J. T., & Hawkley, L. C. (2009). Perceived social isolation and cognition. *Trends in Cognitive Sciences*, *13*(10), 447-454.

Cacioppo, J. T., Hawkley, L. C., Berntson, G. G., Ernst, J. M., Gibbs, A. C., Stickgold, R., & Hobson, J. A. (2002). Do lonely days invade the nights? Potential social modulation of sleep efficiency. *Psychological Science*, *13*(4), 384-387.

Cacioppo, J. T., Hawkley, L. C., & Thisted, R. A. (2010). Perceived social isolation makes me sad: 5-year cross-lagged analyses of loneliness and depressive symptomatology in the Chicago Health, Aging, and Social Relations Study. *Psychology and aging*, *25*(2), 453.

Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. *Psychology and aging*, *21*(1), 140.

Cacioppo, J. T., Norris, C. J., Decety, J., Monteleone, G., & Nusbaum, H. (2009). In the eye of the beholder: individual differences in perceived social isolation predict regional brain activation to social stimuli. *Journal of cognitive neuroscience*, *21*(1), 83-92.

Caspi, A., Harrington, H., Moffitt, T. E., Milne, B. J., & Poulton, R. (2006). Socially isolated children 20 years later: risk of cardiovascular disease. *Archives of Pediatrics & Adolescent Medicine*, *160*(8), 805-811.

Cattan, M., White, M., Bond, J., & Learmouth, A. (2005). Preventing social isolation and loneliness among older people: a systematic review of health promotion interventions. *Ageing & Society*, *25*(1), 41-67.

Cavazos-Rehg, P., Krauss, M. J., Sowles, S. J., Connolly, S., Rosas, C., Bharadwaj, M., . . . Bierut, L. J. (2017). An analysis of depression, self-harm, and suicidal ideation content on tumblr. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 38*(1), 44-52.

Chambers, R., Lo, B. C. Y., & Allen, N. B. (2008). The impact of intensive mindfulness training on attentional control, cognitive style, and affect. *Cognitive Therapy & Research*, *32*(3), 303-322.

Cohen, J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.

Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, *65,* 333-371.

Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine*, *69*(6), 560-565.

Eaker, E. D., Pinsky, J., & Castelli, W. P. (1992). Myocardial infarction and coronary death among women: psychosocial predictors from a 20-year follow-up of women in the Framingham Study. *American journal of epidemiology*, *135*(8), 854-864.

Epton, T., Harris, P. R., Kane, R., van Koningsbruggen, G. M., & Sheeran, P. (2015). The impact of self-affirmation on health-behavior change: A meta-analysis. *Health Psychology*, *34*(3), 187-196.

Fox, J. R. (2009). Eating disorders and emotions. *Clinical Psychology & Psychotherapy*, *16*(4), 237-239.

Fox, J. (2015). *Applied regression analysis and generalized linear models*. Sage Publications.

Gilbert, P. (2015). Self-disgust, self-hatred, and compassion focused therapy. In P. A. Powell, P. G. Overton, & J. Simpson (eds.) *The revolting self: Perspectives on the psychological, social, and clinical implications of self-directed disgust*. London: Karnak.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, *26*(1), 41-54.

Gross, J. J. (2013). Emotion regulation: Taking stock and moving forward. *Emotion*, *13*(3), 359.

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1-26.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality & Social Psychology*, *85*(2), 348.

Gross, J. J., & Muñoz, R. F. (1995). Emotion regulation and mental health. *Clinical psychology: Science and practice*, *2*(2), 151-164.

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. Handbook of Emotion Regulation. 3-27.

Gross, J.J., & John, O.P. (2013) . Emotion Regulation Questionnaire. Measurement Instrument Database for the Social Science. Retrieved from www.midss.ie

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: a theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine*, *40*(2), 218-227.

Hawkley, L. C., Burleson, M. H., Berntson, G. G., & Cacioppo, J. T. (2003). Loneliness in everyday life: cardiovascular activity, psychosocial context, and health behaviors. *Journal of personality and social psychology*, *85*(1), 105.

Hayes, J. R. (2013). *The complete problem solver*. Routledge.

Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review*, *26*(6), 695-718.

Hill, R. M., Yaroslavsky, I., & Pettit, J. W. (2015). Enhancing depression screening to identify college students at risk for persistent depressive symptoms. *Journal of Affective Disorders*, *174*, 1-6.

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research*, *47*(3), 391-400.

Ille., R., Schöggl, H., Kapfhammer, H. P., Arendasy, M., Sommer, M., & Schienle, A. (2014). Self-disgust in mental disorders: Symptom-related or disorder-specific? *Comprehensive Psychiatry, . 55*, 938-943.

Joormann, J., & Gotlib, I. H. (2010). Emotion regulation in depression: relation to cognitive inhibition. *Cognition & Emotion*, *24*(2), 281-298.

Luo, Y., Hawkley, L. C., Waite, L. J., & Cacioppo, J. T. (2012). Loneliness, health, and mortality in old age: A national longitudinal study. *Social Science & Medicine*, *74*(6), 907-914.

Masi, C. M., Chen, H. Y., Hawkley, L. C., & Cacioppo, J. T. (2011). A meta-analysis of interventions to reduce loneliness. *Personality & Social Psychology Review*, *15*(3), 219-266.

Moore, S. A., Zoellner, L. A., & Mollenholt, N. (2008). Are expressive suppression and cognitive reappraisal associated with stress-related symptoms? *Behaviour Research & Therapy*, *46*(9), 993-1000.

Neeleman, J., & Power, M. J. (1994). Social support and depression in three groups of psychiatric patients and a group of medical controls. *Social Psychiatry and Psychiatric Epidemiology*, *29*(1), 46-51.

Nemeroff, C. B., & Goldschmidt-Clermont, P. J. (2012). Heartache and heartbreak—the link between depression and cardiovascular disease. *Nature Reviews Cardiology*, *9*(9), 526-539.

Olatunji, B.O., Cox, R., & Kim, E.H. (2015). Self-disgust mediates the associations between shame and symptoms of bulimia and obsessive-compulsive disorder. *Journal of Social and Clinical Psychology*, *34*(3), 239-258.

Overton, P. G., Markland, F. E., Taggart, H. S., Bagshaw, G. L., & Simpson, J. (2008). Self-disgust mediates the relationship between dysfunctional cognitions and depressive symptomatology. *Emotion*, *8*(3), 379.

Penninx, B. W., Van Tilburg, T., Kriegsman, D. M., Deeg, D. J., Boeke, A. J. P., & van Eijk, J. T. M. (1997). Effects of social support and personal coping resources on mortality in older age: the Longitudinal Aging Study Amsterdam. *American Journal of Epidemiology*, *146*(6), 510-519.

Peplau, L. A., & Perlman, D. (1979, June). Blueprint for a social psychological theory of loneliness. In *Love and attraction: An interpersonal conference* (pp. 101-110). Pergamon Press New York.

Powell, P. A., Overton, P. G., & Simpson, J. (2014). The revolting self: An interpretative phenomenological analysis of the experience of self-disgust in females with depressive symptoms. *Journal of Clinical Psychology*, *70*(6), 562-578.

Powell, P. A., Simpson, J., & Overton, P. G. (2013). When disgust leads to dysphoria: A three-wave longitudinal study assessing the temporal relationship between self-disgust and depressive symptoms. *Cognition & Emotion*, *27*(5), 900-913.

Powell, P. A., Simpson, J., & Overton, P. G. (2015). An introduction to the revolting self: Self-disgust as an emotion schema. In P. A. Powell, P. G. Overton, & J. Simpson (eds.) *The revolting self: Perspectives on the psychological, social, and clinical implications of self-directed disgust* (pp. 1-24). London: Karnak.

Powell, P. A., Simpson, J., & Overton, P. G. (2015). Self-affirming trait kindness regulates disgust toward one's physical appearance. *Body Image*, *12*, 98-107.

Power, M., & Dalgleish, T. (2008). *Cognition and emotion: From order to disorder* (2nd ed.). Hove: Psychology Press.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879-891.

Pritchard, M. E., & Yalch, K. L. (2009). Relationships among loneliness, interpersonal dependency, and disordered eating in young adults. *Personality and Individual Differences*, *46*(3), 341-346.

Qualter, P., Brown, S. L., Munn, P., & Rotenberg, K. J. (2010). Childhood loneliness as a predictor of adolescent depressive symptoms: An 8-year longitudinal study. *European Child & Adolescent Psychiatry*, *19*(6), 493-501.

Rokach, A. (2011). From loneliness to belonging: A review. *Psychology Journal*, *8*(2), 70-81.

Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment*, *42*(3), 290-294.

Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. *Advances in Experimental Social Psychology*, *38*, 183-242.

Simpson, J., Hillman, R., Crawford, T., & Overton, P. G. (2010). Self-esteem and self-disgust both mediate the relationship between dysfunctional cognitions and depressive symptoms. *Motivation & Emotion*, *34*(4), 399-406.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In *Advances in experimental social psychology* (Vol. 21, pp. 261-302). Academic Press.

Thurston, R. C., & Kubzansky, L. D. (2009). Women, loneliness, and incident coronary heart disease. *Psychosomatic Medicine*, *71*(8), 836.

Troy, A. S., Wilhelm, F. H., Shallcross, A. J., & Mauss, I. B. (2010). Seeing the silver lining: cognitive reappraisal ability moderates the relationship between stress and depressive symptoms. *Emotion*, *10*(6), 783.

van der Velden, A. M., Kuyken, W., Wattar, U., Crane, C., Pallesen, K. J., Dahlgaard, J., Fjorback, L. O., & Piet, J. (2015). A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder. *Clinical Psychology Review*, *37*, 26-39.

Vanhalst, J., Luyckx, K., Raes, F., & Goossens, L. (2012). Loneliness and depressive symptoms: The mediating and moderating role of uncontrollable ruminative thoughts. *The Journal of Psychology*, *146*(1-2), 259-276.

Wang, Y. Y., Li, X. H., Zheng, W., Xu, Z. Y., Ng, C. H., Ungvari, G. S., Yuan, Z., & Xiang, Y. T. (2018). Mindfulness-based interventions for major depressive disorder: A comprehensive meta-analysis of randomized controlled trials. *Journal of Affective Disorders*.

Webb, T. L., Schweiger Gallo, I., Miles, E., Gollwitzer, P. M., & Sheeran, P. (2012). Effective regulation of affect: An action control perspective on emotion regulation. *European Review of Social Psychology*, *23*(1), 143-186.

Weeks, D. G., Michela, J. L., Peplau, L. A., & Bragg, M. E. (1980). Relation between loneliness and depression: a structural equation analysis. *Journal of Personality & Social Psychology*, *39*(6), 1238.

Weiss, R. S. (1973). Loneliness: The experience of emotional and social isolation. Cambridge, MA: The MIT Press.

Wei, M., Russell, D. W., & Zakalik, R. A. (2005). Adult attachment, social self-efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: A longitudinal study. *Journal of Counseling Psychology*, *52*(4), 602.

World Health Organization (2017). Depression: Fact sheet. Retrieved from: http://www.who.int/mediacentre/factsheets/fs369/en/

Zahn, R., Lythe, K. E., Gethin, J. A., Green, S., Deakin, J. F. W., Young, A. H., & Moll, J. (2015). The role of self-blame and worthlessness in the psychopathology of major depressive disorder. *Journal of Affective Disorders*, *186*, 337-341.

Zawadzki, M. J., Graham, J. E., & Gerin, W. (2013). Rumination and anxiety mediate the effect of loneliness on depressed mood and sleep quality in college students. *Health Psychology*, *32*(2), 212.