

Stressed, depressed, and rank obsessed: individual differences in Compassion and Neuroticism predispose toward rank-based depressive symptomatology

Jeffrey J. Kim^{ab}, Ruby Gerrish^{ab}, Paul Gilbert^{abc}, James N. Kirby^{ab}

^aSchool of Psychology, The University of Queensland, Brisbane, Queensland, Australia

^bCompassionate Mind Research Group, The University of Queensland, Brisbane, Queensland, Australia

^cCentre for Compassion Research and Training, University of Derby, College of Health and Social Care Research Centre, Derby, UK

Corresponding author: Jeffrey J. Kim
Email: Jeffrey.kim@uqconnect.edu.au
Postal address: School of Psychology,
Level 3 Building 24a
The University of Queensland, St Lucia, 4072
Brisbane, Qld, Australia
Phone: +61 7 3365 6230

Competing Interests Statement: The authors have no competing interests to declare.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data Availability Statement: Data will be made available upon reasonable request.

Abstract

Objectives

As social creatures we monitor our relative rank and/or status with others via social comparisons. Whilst research has identified perceptions of inferiority or 'low rank' relative to others is a robust predictor of depressive, anxious, and stress symptomology, to date individual differences have been ignored. We wish to provide empirical evidence to outline how differences across personality traits may interact with social rank variables to buffer or predispose toward depressive symptomology.

Methods

Across three independent samples ($N = 595$) we replicated a social rank model of mental health, and with our third sample ($N = 200$) we sought to investigate attenuating roles for neuroticism vs compassion with multiple moderated regression models.

Results

Neuroticism predicted greater levels of rank-associated depression, and compassion failed to function as a protective factor for rank-associated depression. However, a closer inspection of the original Big-5 factor-structure positions this scale as a measure of 'interpersonal submissiveness' or 'conflict appeasement' rather than genuine compassion.

Conclusions

Whilst it is necessary to delineate the conditions where compassion is appropriate and able to lead to positive mental-health outcomes, we argue this cannot be addressed with the Big-5 measure of trait compassion. We call for future work to establish how a battery of reliable and valid measures of genuine compassion may fully address how compassion may protect against both rank-based comparisons and severity of depression.

STRESSED, DEPRESSED, AND RANK OBSESSED

Practitioner Points

- Social rank mechanisms are robustly implicated in depression, anxiety, and stress.
- Clients who present as higher in neuroticism, inferiority, or submissiveness may be more prone towards rank-associated depression symptoms.
- Preliminary evidence suggests cultivation of genuine compassion can shift clients from a rank-focussed to a compassionate-focussed mentality, which aids mental health and fosters wellbeing.

Introduction

Given we exist within a hierarchical, social context and seek to form and maintain meaningful social relationships (von Hippel, 2018), it is crucial to understand how our attempts to navigate the complex social world may protect or predispose toward psychopathology. As inherently social creatures, we automatically interpret cues from others which helps to co-regulate our thought, affect and behaviour (Flagan & Beer, 2013; Molenberghs, Johnson, Henry, & Mattingley, 2016). It is increasingly apparent, however, that one expression of our responses to social cues, namely our capacity for *social comparisons* in relation to others, have been robustly implicated in the development of depression and anxiety (La Greca & Harrison, 2005; Santini, Koyanagi, Tyrovolas, Mason, & Haro, 2015; Teo, Choi, & Valenstein, 2013). For example, when an individual engages in unfavourable social comparisons, subsequent feelings of perceived inferiority, shame, and self-critical cognitions ensue, factors which have been implicated in the development/associated with increased symptoms of depression and anxiety (Wyn, Wood, Maltby, Taylor, & Tai, 2014; Zuroff, Fournier, & Moskowitz, 2007). Furthermore, perceived inferiority, in particular, has been shown to predict higher levels of submissiveness and feelings of defeat and entrapment (Price, Sloman, Gardner, Gilbert, & Rohde, 1994). Submissiveness, defeat, and entrapment are debilitating processes in themselves which have also been shown to contribute in the development of depression and anxiety (Siddaway, Taylor, Wood, & Schulz, 2015).

STRESSED, DEPRESSED, AND RANK OBSESSED

The ability for an individual to be prone to social comparisons are driven in part by an implicit and often unconscious capacity for gauging self and other's relative rank and status within the social hierarchy (Goessmann & Hemelrijk, 2000; Koelkebeck et al., 2011; Sapolsky, 2005; Sapolsky, 1991). This mechanism is conserved, neurobiologically, amongst both human and non-human social creatures, highlighting it's prevalence throughout the animal kingdom (Toronchuk & Ellis, 2013). A recognition of how these implicit mechanisms may interact with mental health and manifest within social relationships can be offered by social mentality theory (Gilbert, 2017). From this perspective, 'social mentalities' guide individuals to: (1) seek to create certain types of roles with others, (2) interpret the social signals and roles others are trying to enact with the self, and (3) regulate their affective and behavioral responses (e.g., if others are friendly then approach and act in a friendly way, if others are hostile then attack or avoid) (Gilbert, 2017). Accordingly, rank-based social mentalities (e.g., to see oneself as superior or inferior) are activated in threatening or competitive contexts, highlighting how the aforementioned, implicit rank mechanisms may be recruited quickly and often unconsciously. Importantly, however, social mentality theory recognises that multiple motivational states may be active and exert their influence on individuals at a single timepoint, and that individuals have some choice as to which 'mentality' they might choose to engage with in a given scenario (Hermanto & Zuroff, 2016).

Competing motives are especially relevant within social mentality theory to describe a complex interplay between competition vs care-based, compassionate mentalities (Bartke, Bosworth, Snower, & Chierchia, 2019; Bosworth, Singer, & Snower, 2016). Critically, if individuals judge themselves through a rank mentality they are vulnerable to depressive, anxious and stress symptomatology (Gilbert, 2017; Hermanto & Zuroff, 2016), whereas if an individual evaluates themselves through a compassionate social mentality this can foster wellbeing and promote positive mental-health benefits (Kirby, Tellegen, & Steindl, 2017; Matos, Duarte, & Pinto-gouveia, 2017). Whilst insightful, however, the present literature has failed to recognize the interplay of individual differences which may moderate the expression of depression, anxiety, or stress within

STRESSED, DEPRESSED, AND RANK OBSESSED

a social-rank framework. One approach would be to consider the application of personality factors, as markers of individual differences in temperament.

Personality factors

Hierarchical models of personality recognise that domains of personality (e.g., the Big Five) are composed of distinct sub-components (Lee & Ashton, 2004; Soto & John, 2017). One such scale that we seek to utilize in the current work is the Big Five Aspect Scales (BFAS) measure (DeYoung, Quilty, & Peterson, 2007a). The Big Five Aspect Scales (BFAS; DeYoung et al., 2007), considers personality to include both *interpersonal traits*, Agreeableness (comprised of politeness and compassion) and Extraversion (comprised of enthusiasm and assertiveness), and *intrapersonal traits*, which includes Neuroticism (comprised of volatility and withdrawal), conscientiousness (industriousness and orderliness), and openness/intellect (openness and intellect).

The importance of examining these lower level aspects are numerous, particularly as differences across personality traits have been associated with diverse psychological outcomes. For example, personality traits have been shown to predict outcomes across interpersonal relationships (Mihailovic & Lojic, 2003), job and life satisfaction (Judge, Bono, Locke, Tippie, & Judge, 2000; Okwaraji, Nduanya, Okorie, & Okechukwu, 2019), and in some cases longevity of life and wellbeing (Friedman & Kern, 2014; Lachmann et al., 2017). It is important to note differences in personality are not merely ‘skin-deep’; rather, personality differences have been associated with distinct neurobiological correlates (DeYoung et al., 2010, 2007a; Dubois, Adolphs, & States, 2017).

Present research

In this paper we were specifically interested in compassion and neuroticism, as assessed from the Big-5, as potential moderators within a social-rank model of depression. Whilst trait neuroticism’s role in predicting depressive symptoms is well established (Brown & Rosellini, 2011; Roelofs, Huibers, Peeters, & Arntz, 2008), trait compassion’s potential protective effect is less well known. However, whilst not linked with the Big-5 measure directly, cultivating compassion has

STRESSED, DEPRESSED, AND RANK OBSESSED

been associated with positive mental-health benefits and wellbeing (Hildebrandt, Mccall, & Singer, 2017; Hope, Koestner, & Milyavskaya, 2014; Neff, Rude, & Kirkpatrick, 2007). Accordingly, we suggest trait compassion as assessed from the Big-5 may function as a potential protective buffer against depressive symptomology, as assessed within a social rank framework. In contrast, however, we suggest neuroticism will be a predisposing factor for depressive symptomology within a social rank framework.

Materials and Method

Participants

A total of 595 participants took part in the present study. Sample 1 comprised 246 participants (179 female), age range 17-65 years ($M = 31.81$, $SD = 11.94$). Sample 2 comprised 141 participants (104 female), age range 17-60 years ($M = 20.57$, $SD = 5.75$). Sample 3 comprised 204 participants (115 female), age range 18-35 years ($M = 24.5$, $SD = 2.34$). The University of Queensland Human Research Ethics Committee approved the experimental protocol. Participation was voluntary and anonymous. Subjects provided informed, written or electronic consent. First and third samples were convenience university samples who participated for course credit, and the second sample were recruited from the Amazon Mechanical Turk Platform who received \$2.00 USD for survey completion.

Materials

Mental Health. All measures utilized sum scores of psychological scales. Depression and anxiety symptoms were measured using the shortened version of the Depression Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 includes 21 items of the original 42 item scale and is comprised of three seven-item subscales measuring depression, anxiety and stress. For the subscales of depression (e.g., “I felt that I had nothing to look forward to”), anxiety (e.g., “I felt scared without any good reason”), and stress (e.g., “I found it hard to wind down”), participants were asked to rate how much each statement reflected their experienced mood over the past week. Responses were recorded on a 4-point Likert scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much*). Total scores were derived by the sum of each subscale, with higher totals indicating a higher severity of symptoms. The DASS-21 has good reliability amongst both student and community samples, with alphas ranging from .81-.88 (Henry & Crawford, 2005; Osman et al., 2012). The subscales also have good convergent and discriminant validity with other validated measures of depression and anxiety, such as the Hospital Anxiety and

Depression Scale and the Personal Disturbance Scale (Henry & Crawford, 2005). Our sample had good to excellent internal reliability for anxiety ($\alpha = .86$), depression ($\alpha = .92$), and stress ($\alpha = .82$).

Social comparison. The Social Comparison Scale (Allan & Gilbert, 1995) is an 11-item scale that measures an individual's perception of their social rank, attractiveness and belonging relative to others. The scale consists of a series of bipolar constructs (e.g., "inferior-superior") for which participants are asked to rate how they see themselves in comparison to others on a 10-point scale. The scale is scored as a sum of the 11 items, with higher scores indicating more favourable perceptions of social rank. It has been shown to have good reliability amongst both clinical and student populations, with alphas ranging from .88-.96 and .90-.91, respectively (Allan & Gilbert, 1995). We found the scale to have excellent internal reliability ($\alpha = .91$).

Submissive behaviour. Participants' engagement in submissive behaviour was measured using the Submissive Behaviour Scale (Allan & Gilbert, 1997). The original scale (Gilbert & Allan, 1994) was developed based on research from Buss & Craik (1989) and later refined by Allan and Gilbert (1997). The 16-item scale assesses how individuals respond in social situations (e.g., "I do what is expected of me even when I don't want to"). Responses were recorded on a 5-point Likert scale ranging from 0 (*never*) to 4 (*always*), with higher total scores indicating higher frequencies of submissive behaviour. The scale has good internal reliability ($\alpha = .89$) and good test-retest reliability amongst a student sample, $r = .84, p < .001$ (Gilbert, Allan, & Trent, 1995). We found the scale to have excellent internal reliability ($\alpha = .91$).

Big-5 Aspects Scale. The BFAS is a 100-item measure of the lower-level aspects that incorporate each of the "Big Five" factors of personality. The BFAS yields two distinct, correlated aspects per each of the "Big Five" factors (DeYoung et al., 2007). Each item is rated on a 7-point Likert scale. The BFAS has demonstrated good overall internal consistency ($\alpha = .89$), and good construct validity (DeYoung et al., 2007). We found excellent internal consistency for interpersonal traits, which encompasses neuroticism, conscientiousness, openness/intellect alongside respective subscales, at $\alpha = .85$. Additionally, we identified good internal consistency for intrapersonal traits,

STRESSED, DEPRESSED, AND RANK OBSESSED

which encompasses both agreeableness and extraversion alongside their corresponding subscales, at $\alpha = .74$. In this study we focused on the compassion aspect of the agreeableness scale, as well the factor of trait neuroticism.

Results

Consistency of Association across each sample

Relationships between all focal variables for each sample are depicted in Tables 1, 2, and 3. Overall, we were interested in associations between two key social-rank variables, social comparison and submissive behaviour, which we hypothesize will predict depressive, anxious, and stress symptomatology. Next, with our third sample, we were interested in testing various hierarchical moderated multiple regression models to examine the interplay of personality factors which may affect the relationship between social-rank variables on depressive symptomatology. Specifically, we were interested in the potential moderating effects of compassion and neuroticism for both social comparison and submissive behaviour.

STRESSED, DEPRESSED, AND RANK OBSESSED

Table 1: Correlations of Social Rank variables and DASS-21, Sample 1

Variables	1	2	3	4
1.Social Comparison	-			
2.SubmissiveBehaviour	-.60**	-		
3. Depression	-.54**	.58**	-	
4. Anxiety	-.43**	.59**	.64**	-
5. Stress	-.45**	.59**	.66**	.70**

** . Correlation is significant at the 0.01 level (2-tailed).

Table 2: Correlations of Social Rank variables and DASS-21, Sample 2

Variables	1	2	3	4
1.Social Comparison	-			
2.SubmissiveBehaviour	-.18**	-		
3. Depression	.090	.80**	-	
4. Anxiety	.27	.80**	.86**	-
5. Stress	.08	.80**	.90**	.87**

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3: Correlations of Social Rank variables and DASS-21, Sample 3

Variables	1	2	3	4	5	6
1.Social Comparison	-					
2.SubmissiveBehaviour	-.42**	-				
3. Depression	-.46**	.41**	-			
4. Anxiety	-.33**	.38**	.67**	-		
5. Stress	-.26**	.37**	.62**	.70**	-	
6. Compassion	-0.03	-.10	-.10	-.04	.02	-
7. Neuroticism	-.39**	.40**	.49**	.47**	.63**	-.06

** . Correlation is significant at the 0.01 level (2-tailed).

Conditional effect of Social Comparison as a function of Trait Compassion

To assess the potential moderating influence specific personality variables may exhibit on social-rank based depression, numerous hierarchical moderated multiple regression analyses were conducted. To avoid potential multicollinearity with the interaction term, variables were mean-centered prior to analysis (Aiken & West, 1991). The first regression model investigated trait compassion as a potential moderator between social comparison and depressive symptomatology. Variables were entered as follows: control variables age and gender at block one, social comparison at block two, trait compassion at block three, and the interaction between social comparison and trait compassion at block 4. At the first step, age and sex did not account for any significant variance in the model, $\Delta R^2 = .002$, $\Delta F(3, 199) = .16$, $\beta = .06$, $p = .85$. At the second and third step, a main effect of social comparison but not trait compassion were revealed ($\Delta R^2 = .22$, $\Delta F(1, 199) = 55.81$, $\beta = -.48$, $t(201) = -7.50$, $p < .001$, and $\Delta R^2 = .01$, $\Delta F(1, 198) = 3.10$, $\beta = -.11$, $t(201) = -1.76$, $p = .10$, respectively). At the fourth step, however, the interaction between social comparison and trait compassion was significant, $\beta = -.01$, $t(199) = -2.06$, $p < .04$. Examination of the interaction plot showed an attenuating effect of compassion on social rank-associated depression symptoms (Figure 1a). Simple-slope analyses revealed when social comparison is low, compassion increases depressive symptoms; $\beta = -.11$, $t(201) = -4.05$, $p = .01$. When social comparison is high, compassion appears to buffer depressive symptoms, $\beta = -.19$, $t(201) = -6.76$, $p < .01$.

Conditional effect of Submissive Behaviour as a function of Trait Compassion

The second regression model investigated how trait compassion may moderate submissive-behaviour and depressive symptomatology. Variables were entered as follows: control variables age and gender entered at block one, submissive behaviour at block two, trait compassion at block three, and the interaction term between submissive behaviour and trait compassion at block four. At the first step, age and sex did not account for any significant variance in the model, $\Delta R^2 = .002$, $\Delta F(3, 199) = .16$, $\beta = .06$, $p = .85$. At the second and third step, a main effect of

STRESSED, DEPRESSED, AND RANK OBSESSED

submissive behaviour but not trait compassion was revealed ($\Delta R^2 = .17$, $\Delta F(1, 199) = 39.40$, $\beta = .41$, $t(201) = 6.28$, $p < .001$, and $\Delta R^2 = .003$, $\Delta F(1, 198) = .82$, $\beta = -.06$, $t(199) = -.90$, $p = .37$, respectively). At the fourth step, the interaction between submissive behaviour and trait compassion failed to reach significance, $\beta = -.01$, $t(199) = -2.06$, $p = .62$ (Figure 1b).

Conditional effect of Social Comparison as a function of Neuroticism

The third regression model investigated how neuroticism may moderate social-comparison based depressive symptomatology. Variables were entered as follows: control variables age and gender entered at block one, social comparison at block two, neuroticism at block three, and the interaction term between social comparison and neuroticism at block four. At the first step, age and sex did not account for any significant variance in the model, $\Delta R^2 = .002$, $\Delta F(2, 199) = .16$, $\beta = .05$, $p = .85$. At the second and third step, a main effect of social comparison and neuroticism was revealed ($\Delta R^2 = .22$, $\Delta F(1, 198) = 55.84$, $\beta = -.47$, $t(201) = 18.75$, $p < .001$, and $\Delta R^2 = .11$, $\Delta F(1, 197) = 31.63$, $\beta = .36$, $t(201) = 5.63$, $p = .001$, respectively). At the fourth step, the interaction between social comparison and neuroticism failed to reach significance, $\beta = -.01$, $t(201) = -1.06$, $p = .11$ (Figure 2a).

Conditional effect of Submissive Behaviour as a function of Neuroticism

The fourth and final regression model investigated how neuroticism may moderate submissive-behaviour based depressive symptomatology. Variables were entered as follows: control variables age and gender entered at block one, submissive behaviour at block two, neuroticism at block three, and the interaction term between submissive behaviour and neuroticism at block four. At the first step, age and sex did not account for any significant variance in the model, $\Delta R^2 = .002$, $\Delta F(3, 199) = .16$, $\beta = .05$, $p = .85$. At the second and third step, a main effect of submissive behaviour and neuroticism was revealed ($\Delta R^2 = .17$, $\Delta F(1, 198) = 38.94$, $\beta = .41$, $t(201) = 6.24$, $p < .001$, and $\Delta R^2 = .13$, $\Delta F(1, 197) = 34.72$, $\beta = .39$, $t(201) = 5.90$, $p = .001$, respectively). At the fourth step, the interaction between submissive behaviour and neuroticism failed to reach significance, $\beta = -.01$, $t(199) = 1.56$, $p = .12$ (Figure 2b).

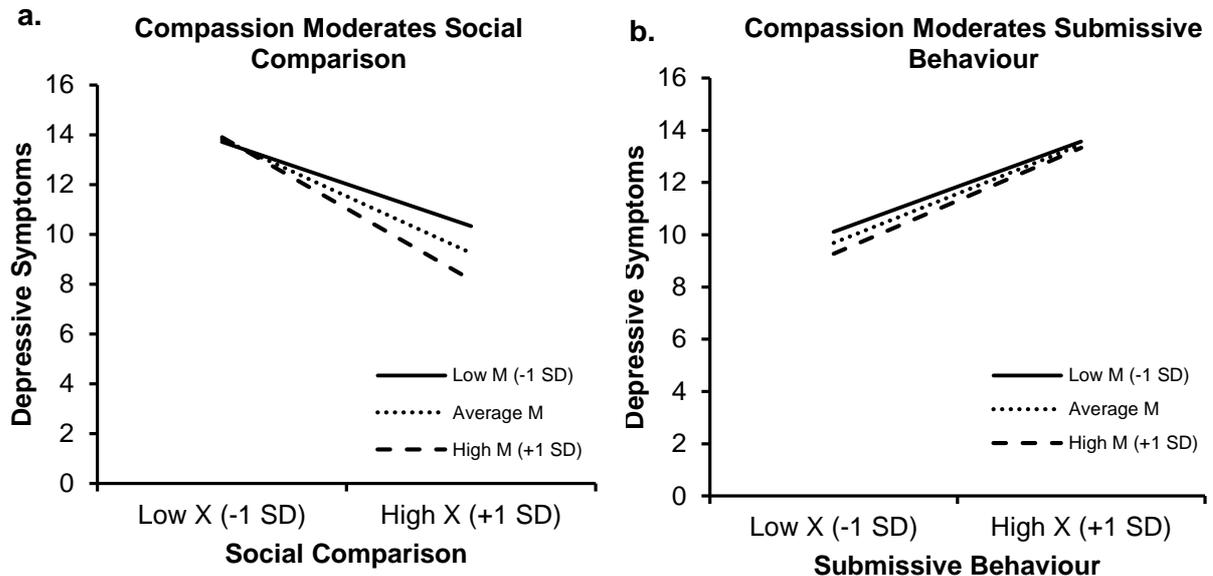


Figure 1. Conditional effects of **a. Social Comparison** and **b. Submissive Behaviour**, respectively, on Depression as a function of Compassion at +/- 1 SD. **a. Social Comparison:** For those high in trait compassion, high but not low social comparison buffers against depressive symptoms. Furthermore, those low in trait compassion also receive a buffer against depressive symptoms if also higher on social comparison. **b. Submissive Behaviour:** Regardless of levels of compassion, high versus low submissiveness are associated with greater depressive symptoms.

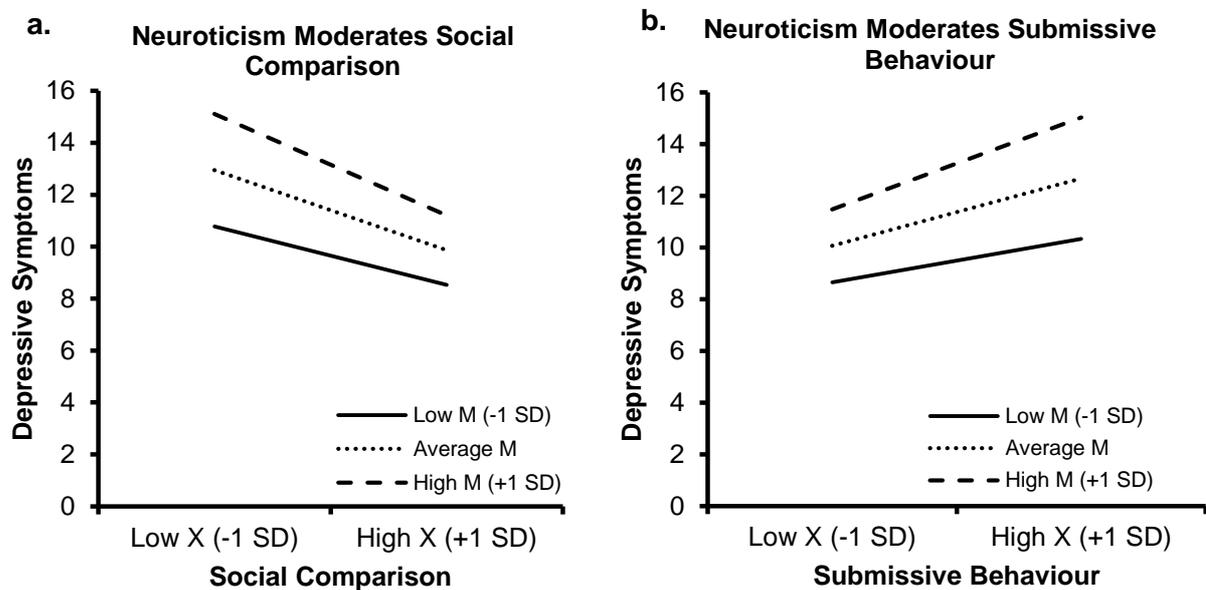


Figure 2. Conditional effects of **a. Social Comparison** and **b. Submissive Behaviour**, respectively, on Depression as a function of Neuroticism at +/- 1 SD. **a. Social Comparison:** For those high in neuroticism, high but not low social comparison buffers against depressive symptoms. Those low in neuroticism also receive a buffer against depression symptoms if also higher in social comparison. **b. Submissive Behaviour:** For those high in neuroticism, greater levels of submissiveness were associated with greater levels of depressive symptoms. Those low in neuroticism have increased depressive symptoms if concurrently higher on submissive behaviour.

Discussion

Within the present research, we sought to investigate how individual differences in personality may buffer or predispose toward depression symptomatology within a social rank model. Overall, we report empirical evidence for two key personality traits, compassion versus neuroticism, in relation to two competing social-rank variables, social comparison (whereby greater scores indicate more favourable perceptions of self, compared with others) and submissive behaviour (whereby greater scores indicate more submissiveness).

As anticipated, higher levels of neuroticism were associated with greater depressive symptoms, across both high and low levels of social comparison. Greater levels of neuroticism across both low and high levels of submissiveness also predicted greater levels of depressive symptomatology. Taken together, these results replicate previous literature which highlighted greater levels of trait neuroticism were associated with concurrent increases in depressive symptoms (Brown & Rosellini, 2011; Roelofs et al., 2008).

Trait compassion's effect, however, was more nuanced. High (but not low) scorers on compassion who were also higher on social comparison exhibited a reduction in depressive symptomatology. However, the difference between high vs low levels of compassion were no longer significant for those who were low in social comparison. Furthermore, contrary to predictions, compassion exhibited no significant relationship with submissiveness. Given compassion did not form a protective role for those who were low in rank or submissive, it is apparent that compassion failed to protect against depressive symptoms. This is against what the broader clinical literature suggests.

First, clinical evidence of training people in compassion has established a wide range of psychological (Desbordes et al., 2012; Gorno-Tempini et al., 2004; Jazaieri et al., 2014; Weng et al., 2013) and therapeutic benefits (Hofmann, Grossman, & Hinton, 2012; Kirby et al., 2017), including for people with severe mental health difficulties (Braehler, Gumley, Harper, Wallace, Norrie, & Gilbert, 2012), such as psychotic disorders (Braehler et al., 2012), eating disorders (Kelly

& Carter, 2015), personality disorders (Lucre & Corten, 2013), depression (Collins, Gilligan, & Poz, 2018), and traumatic brain injury (Ashworth, F., Gracey, F., Gilbert, 2011). Furthermore, evidence from cognitive neuroscience has established that cultivation of compassion and/or loving kindness meditation has been shown to reduce activity in regions known to code for negative affect (Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008) and up-regulate systems involved in positive affect and motivation to attend, be aware of, and reduce suffering (Kim et al., 2009; Valk et al., 2017).

It is clear, therefore, that the wealth of evidence supporting compassion's role in promoting positive mental health benefits is not in accord with our findings of the Big-5 measure of trait compassion. Therefore, we propose that trait-compassion from the Big-5, which was originally conceptualized to measure "compassionate emotional affiliation with others (e.g., Warmth, Sympathy, Tenderness", may in fact be a measure of 'interpersonal submissiveness', rather than a temperament of genuine compassion. This appraisal is in accordance with the original conceptualization of the Big-5 factor-structure, as compassion was originally conceptualized as a low-order aspect of trait agreeableness, along with politeness. However, we would argue that this is a misrepresentation of compassion; indeed, when acting compassionately, one might be disagreeing with the status quo or inequality in one's social hierarchy. For example, standing up for injustice might mean disagreeing with current policy or current standards imposed by regulating bodies. The key point is compassion is contextual, and there are times when compassion requires assertiveness, and thus is not to be confused with agreeableness. It is perhaps humorous to ponder that a better measurement for compassion within the present study would have been to measure the BFAS aspect of assertiveness, under the Extraversion factor!

To expand upon this point, recent work has established those who were agreeable and conscientious were most likely to provide a shock to a participant in a similar paradigm to Milgram's obedience studies (Bègue et al., 2014; Milgram, 1963). This evidence alongside our results suggests that the measure of agreeableness, with the lower-order aspects of politeness and

STRESSED, DEPRESSED, AND RANK OBSESSED

compassion, is more reflective of a ‘conflict avoidance and appeasement scale’, as opposed to a compassion scale. Importantly, compassion is a motive, which if genuine, is focused on the courage to be sensitive and engage with suffering in self and others, with a commitment to try to work out how to alleviate and prevent it (Catarino, Gilbert, McEwan, & Baião, 2014). Thus, a compassionately oriented response in this context would be to disagree with the experimenter and not deliver the shock, whereas an agreeable, conflict avoidant person, would and did (Bègue et al., 2014).

Importantly, compassion can blend with other motives, and individuals can use compassion for many kinds of purposes, for example to be liked or to appease others. Gilbert and Allen (1994) state, “*submissive behavior is typically linked to the perception of lower social rank and functions as an appeasing strategy that can involve the inhibition of one’s own hostile feelings, lack of assertiveness, denial of personal wants and needs to appease others to avoid threat from them.*” While submissiveness is associated with mental health problems, genuine compassion is not. Catarino, Gilbert, McEwan, & Baião (2014) developed a measure of submissive compassion, which aimed to assess for how compassionate actions can be enacted in order to be liked by highly ranked others and to avoid rejection. This scale includes items such as, “*I try to help people as much as I can so that they appreciate me*” and “*I worry that if I am not caring enough, people will reject me*”. In a study involving 157 students (115 women, 42 men, age-range 17-52 years, $M = 31.35$; $SD = 9.65$), the authors found that submissive compassion was significant and moderately correlated with depression and anxiety, and self-image goals. Importantly, submissive compassion was not correlated with compassion for others or compassionate goals. We think our results demonstrate, in a sample of participants who are elevated on depressive symptomatology, who view themselves as lower ranked, use compassion as a strategy to minimize further possible threat from others (e.g., rejection or being alone) and to increase the likelihood of being liked.

When examining the compassion items of the BFAS, the items include, “*Like to do things for others*” and “*Inquire about others’ well-being*”. Although these items can certainly be linked to a

STRESSED, DEPRESSED, AND RANK OBSESSED

genuine motivation for compassion, they can also tap into the motivational system of rank, which we think in our study it does. Showing an interest in others and appearing helpful to others (e.g., submissive or appeasing), particularly when in low-rank is a commonly used safety behaviour for those who believe that people wouldn't like them and they would be rejected if they were just being themselves (Gilbert, Mcewan, Matos, & Ravis, 2011). Moreover, if one is compassionately motivated one may inquire about others' well-being, however, one can also inquire about others' well-being from a rank/competitive motive. Indeed, knowing a dominant figure (e.g., boss, parent) is not well, might mean we need to keep our distance, be submissive and appease so we are not hurt. Furthermore, although these items assess a person's interest in others, the items do not assess for wanting to engage or alleviate suffering. Indeed, suffering is at the core of compassion, thus items not contextualized in suffering might actually be measuring near constructs such as kindness or empathy (Gilbert, Basran, Kirby, 2019). The negatively scored items which contribute to the compassion score on the BFAS includes, "I *don't have a soft side*", we are unsure on how this is linked specifically to compassion, as no definition of compassion includes "soft side". Rather compassion is linked to the courage to engage with suffering, and will include a range of different emotions that are contextually dependent. Indeed, anger might be the emotion when trying to prevent the suffering being inflicted on a minority group. An individual with agoraphobia engaging in exposure therapy is doing so in order to reduce their suffering and to live a full-life. This is clearly compassionate, trying to reduce the suffering experienced with agoraphobia, however, one would not coin this compassionate act of exposure as being 'soft'. Indeed, the individual is moving towards the very things they are frightened of, and that takes a great deal of courage. Therefore, these aspects of the compassion subscale may be influencing the findings obtained in our study.

Limitations

Furthermore, whilst it may be considered a drawback that we did not explicitly recruit individuals diagnosed with depression, the fact that our dataset revealed a sample elevated in depression is striking. First, for a sample of 200 students it highlights how regardless of scores on

STRESSED, DEPRESSED, AND RANK OBSESSED

the moderator (i.e., mean, high, or low), participants were scoring approximately within the severe range of DASS-21 (i.e., refer to Figures 1 and 2). Given this sample comprised higher-education students, our work can also be positioned amongst the broader context that college students are disproportionately stressed (Saleh, Camart, & Romo, 2017), depressed (Habibirwe et al., 2018), anxious (Eisenberg, Gollust, Golberstein, & Hefner, 2007), and rank obsessed (Perry, Kane, Bernesser, & Spicker, 1990) relative to the general population (Evans, Bira, Gastelum, Weiss, & Vanderford, 2018). We also remark briefly upon our finding within sample 2, which failed to replicate social comparison's ability to relate to all other variables within this sample (i.e., Table 2). This finding is against what the literature predicts. Furthermore, we were able to establish the predicted role for social comparison within both sample 1 and 3. Whilst we are unsure why this occurred within sample 2, we suspect it might be due to participant's failing to understand how to score the measure appropriately.

For future work, we propose the adoption of multiple additional scales, such as the submissive compassion scale (Catarino et al., 2014), fears of compassion scales (Gilbert et al., 2011), and the self-compassion scale (Neff, 2003). This would allow us to assess to what degree a genuine cultivation of compassion may truly buffer against rank-based depressive symptomatology, and also assess the potential moderating role for increases in fears of compassion (i.e., to the self, or expressing, or responding to other's compassion). Indeed, a recent meta-analysis has established greater fears of compassion to the self and greater fears of receiving compassion from others predicts strong associations with mental health variables such as self-criticism, shame, and anxiety (Kirby, Day, & Sagar, 2019), so we would anticipate these dual variables would play a key role in predisposing toward depressive symptoms within the social rank framework.

Another factor relevant to future compassion research is a call to delineate the boundary conditions within contemplative science and meditative traditions, with the explicit goal to map the potential for positive vs negative experience and outcomes from engaging and/or training in certain practices (Dam et al., 2018a; Dam, et al., 2018b; Lindahl, Fisher, Cooper, Rosen, & Britton,

2017). To position our current work within this debate, whilst our research investigating Big-5 compassion seemed to identify no negative outcomes for higher scorers on this trait, we did observe evidence that trait compassion fails to function how it is typically evidenced to in accord with the broader clinical literature. Whilst we argue this is due to conflating the measurement of compassion with submissiveness, future work would also need to be conducted in order to fully address such possibilities.

Conclusions

Humans are deeply social creatures. Accordingly, we exhibit a tendency to engage in high levels of social comparison, in order to determine our social rank, which can hold deleterious outcomes for our mental health and subsequent interactions with others. Our research has identified that specific individual differences in compassion and neuroticism appear to predispose individuals toward greater depressive symptoms within a social rank framework, except for those who are also higher in compassion who also rate highly on social comparison. Whilst we require future research with additional compassion measures in order to fully examine (genuine) compassion's relationship with rank and mental health variables, our results provide clear evidence that differences in personality are able to attenuate rank-based depressive symptoms. Practically, our research suggests that individual differences in temperament may warrant consideration from clinicians, as rank-based personality interactions may undergird presentations of ruminative social-processes such as rank, shame, or self-criticism. We look forward to future research which could investigate the degree to which personality traits are 'stable' or can be shifted within this social rank model to promote greater mental health and wellbeing, as well as research which will continue to assess the 'boundary conditions' of compassion, to identify for whom and under what conditions compassion cultivation is appropriate.

References

- Aiken, L. S., West, S. G. (1991). *Multiple regression: testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications, Inc.
- Allan, S., Gilbert, P. (1995). A social comparison scale: psychometric properties and relationship to psychopathology. *Personality and Individual Differences*, 19(3), 293–299. <https://doi.org/10.1017/CBO9781107415324.004>
- Allan, S., & Gilbert, P. (1997). Submissive behaviour and psychopathology. *British Journal of Clinical Psychology*, 36(4), 467–488. <https://doi.org/10.1111/j.2044-8260.1997.tb01255.x>
- Allen, T. A., Carey, B. E., McBride, C., Bagby, R. M., Deyoung, C. G., & Quilty, L. C. (2018). Big Five aspects of personality interact to predict depression, (May 2017), 714–725. <https://doi.org/10.1111/jopy.12352>
- Ashworth, F., Gracey, F., Gilbert, P. (2011). Compassion focused therapy after traumatic brain injury: Theoretical foundations and a case illustration. *Brain Impairment*, 12(2), 128–139.
- Bartke, S., Bosworth, S. J., Snower, D. J., & Chierchia, G. (2019). Motives and comprehension in a public goods game with induced emotions. *Theory and Decision*, 86(2), 205–238. <https://doi.org/10.1007/s11238-018-9677-5>
- Bègue, L., Beauvois, J., Courbet, D., Oberlé, D., Lepage, J., & Duke, A. A. (2014). Personality Predicts Obedience in a Milgram Paradigm, 1–8. <https://doi.org/10.1111/jopy.12104>
- Biran, J., Tahor, M., Wircer, E., & Levkowitz, G. (2015). Role of developmental factors in hypothalamic function. *Frontiers in Neuroanatomy*, 9(April), 1–11. <https://doi.org/10.3389/fnana.2015.00047>
- Bosworth, S. J., Singer, T., & Snower, D. J. (2016). Cooperation, motivation and social balance. *Journal of Economic Behavior and Organization*, 126, 72–94.
- Braehler, C., Gumley, A., Harper, J., Wallace, S., Norrie, J, Gilbert, P. (2012). Exploring change processes in compassion focused therapy in psychosis: Results of a feasibility randomized controlled trial. *British Journal of Clinical Psychology*, 52(2), 199–214.

<https://doi.org/10.1111/bjc.12009>

- Brown, T. A., & Rosellini, A. J. (2011). The direct and interactive effects of neuroticism and life stress on the severity and longitudinal course of depressive symptoms. *Journal of Abnormal Psychology, 120*(4), 844–856. <https://doi.org/10.1037/a0023035>.The
- Buss, D. M., & Craik, K. H. (1989). On the cross-cultural examination of acts and dispositions. *European Journal of Personality, 3*(4), 241–261. <https://doi.org/10.1002/per.2410030104>
- Catarino, F., Gilbert, P., McEwan, K., & Baião, R. (2014). Compassion motivations: distinguishing submissive compassion from genuine compassion and its association with shame, submissive behavior, depression, anxiety and stress. *Journal of Social and Clinical Psychology, 33*(5), 399–412. <https://doi.org/10.1521/jscp.2014.33.5.399>
- Collins, R. N., Gilligan, L. J., & Poz, R. (2018). The evaluation of a compassion-focused therapy group for couples experiencing a dementia diagnosis. *Clinical Gerontologist, 41*(5), 474–486. <https://doi.org/10.1080/07317115.2017.1397830>
- Dam, N. T. Van, Vugt, M. K. Van, Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., Fox, K. C. R., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A., & Meyer, D. A. (2018). Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation. *Perspectives on Psychological Science, 13*(1), 36–61. <https://doi.org/10.1177/1745691617709589>
- Dam, N. T. Van, Vugt, M. K. Van, Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., Fox, K. C. R., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A., & Meyer, D. A. (2018). Reiterated Concerns and Further Challenges for Mindfulness and Meditation Research: A Reply to Davidson and Dahl. *Perspectives on Psychological Science, 13*(1), 66–69. <https://doi.org/10.1177/1745691617727529>
- Desbordes, G., Negi, L. T., Pace, T. W. W., Wallace, B. A., Raison, C. L., & Schwartz, E. L. (2012). Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state. *Frontiers in Human Neuroscience, 6*(292), 1–11. <https://doi.org/10.3389/fnhum.2012.00292>

1–15. <https://doi.org/10.3389/fnhum.2012.00292>

Deyoung, C. G., Carey, B. E., Krueger, R. F., & Ross, S. R. (2016). Supplemental material for ten aspects of the big five in the personality inventory for DSM–5. *Personality Disorders: Theory, Research, and Treatment*, 7(2), 113–123. <https://doi.org/10.1037/per0000170.supp>

Deyoung, C. G., Hirsh, J. B., Shane, M. S., Papademetris, X., Rajeevan, N., & Jeremy, R. (2010). Testing predictions from personality neuroscience: brain structure and the big five. *Psychological Science*, 21(820). <https://doi.org/10.1177/0956797610370159>

Deyoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the big five. *Journal of Personality and Social Psychology*, 93(5), 880–896. <https://doi.org/10.1037/0022-3514.93.5.880>

Drevets, W. C., Price, J. L., & Furey, M. L. (2008). Brain structural and functional abnormalities in mood disorders: Implications for neurocircuitry models of depression. *Brain Structure and Function*, 213(1–2), 93–118. <https://doi.org/10.1007/s00429-008-0189-x>

Dubois, J., Adolphs, R., & States, U. (2017). Building a science of individual differences from fMRI. *Trends in Cognitive Science*, 20(6), 425–443. <https://doi.org/10.1016/j.tics.2016.03.014>.

Eisenberg, D., Gollust, S. E., Golberstein, E., Hefner, J. L. (2007). Prevalence and correlates of depression. *American Journal of Orthopsychiatry*, 77(4), 534–542.

Evans, T. M., Bira, L., Gastelum, J. B., Weiss, L. T., & Vanderford, N. L. (2018). Evidence for a mental health crisis in graduate education. *Nature Biotechnology*, 36(3), 282–284. <https://doi.org/10.1038/nbt.4089>

Felger, J. C., & Lotrich, F. E. (2013). Inflammatory cytokines in depression: neurobiological mechanisms and therapeutic implications. *Neuroscience*, 199–229. <https://doi.org/10.1016/j.biotechadv.2011.08.021>.

Flagan, T., & Beer, J. S. (2013). Three ways in which midline regions contribute to self-evaluation. *Frontiers in Human Neuroscience*, 7, 1–12. <https://doi.org/10.3389/fnhum.2013.00450>

Franz, M., McLean, E., Tung, J., Altmann, J., & Alberts, S. C. (2015). Self-organizing dominance

STRESSED, DEPRESSED, AND RANK OBSESSED

- hierarchies in a wild primate population. *Proceedings of the Royal Society B: Biological Sciences*, 282(1814). <https://doi.org/10.1098/rspb.2015.1512>
- Friedman, H., & Kern, M. (2014). Personality, Well-Being, and Health (2014). *Annual Review of Psychology*, 65, 719-742. <https://doi.org/10.1146/annurev-psych-010213-115123>
- Fujimoto, S., Hirata, B., & Nagayama, T. (2011). Dominance hierarchy-dependent behavioural plasticity of crayfish avoidance reactions. *Journal of Experimental Biology*, 214(16), 2718–2723. <https://doi.org/10.1242/jeb.057752>
- Gilbert, P., Allan, S., Trent, D. R. (1995). Involuntary subordination or dependency as key dimensions of depressive vulnerability? *Journal of Clinical Psychology*, 51(6), 740–752.
- Gilbert, P. (1992). *Counselling for depression*. London: Sage Publications.
- Gilbert, P. (2000). Social mentalities: internal “social” conflicts and the role of inner warmth and compassion in cognitive therapy. In P. Gilbert, K. G Bailey (Eds.), *Genes on the Couch: Explorations in Evolutionary Psychotherapy* (pp. 118–150). New York: Routledge.
- Gilbert, P. (2006). Evolution and depression: Issues and implications. *Psychological Medicine*, 36(3), 287–297. <https://doi.org/10.1017/S0033291705006112>
- Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology*, 53(1), 6–41. <https://doi.org/10.1111/bjc.12043>
- Gilbert, P. (2017). A brief outline of the evolutionary approach for compassion focused therapy. *EC Psychology and Psychiatry*, 3, 218–227.
- Gilbert, P., & Allan, S. (1994). Assertiveness, submissive behaviour and social comparison. *British Journal of Clinical Psychology*, 33(3), 295–306. <https://doi.org/10.1111/j.2044-8260.1994.tb01125.x>
- Gilbert, P., & Allen, S. (1998). The role of defeat and entrapment (arrested fight) in depression: an exploration of an evolutionary view. *Psychological Medicine*, 28, 584–597.
- Gilbert, P., & Procter, S. (2006). Self-criticism: overview and pilot study of a group therapy approach. *Clinical Psychology*, 379, 353–379. <https://doi.org/10.1002/cpp>

STRESSED, DEPRESSED, AND RANK OBSESSED

- Goessmann, C., & Hemelrijk, C. (2000). The formation and maintenance of crayfish hierarchies: behavioral and self-structuring properties. *Behavioural Ecology and Social Biology*, *48*, 418–428.
- Gorno-Tempini, M. L., Rankin, K. P., Woolley, J. D., Rosen, H. J., Phengrasamy, L., & Miller, B. L. (2004). Cognitive and behavioral profile in a case of right anterior temporal lobe neurodegeneration. *Cortex*, *40*(5), 631–644.
- Habibirwe, P., Porovecchio, S., Bramboiu, I., Ciobanu, E., Croituru, C., Cazacum I., Peze, T., Ladner, J., Tavolacci, M. (2018). Depression, anxiety and stress among college students in three European countries. *European Journal of Public Health*, *28*, 317–318. <https://doi.org/https://doi.org/10.1093/eurpub/cky214.026>
- Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression anxiety stress scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *44*(2), 227–239. <https://doi.org/10.1348/014466505X29657>
- Hermanto, N., & Zuroff, D. C. (2016). The social mentality theory of self-compassion and self-reassurance: The interactive effect of care-seeking and caregiving. *The Journal of Social Psychology*, *156*(5), 523–535. <https://doi.org/10.1080/00224545.2015.1135779>
- Hildebrandt, L. K., McCall, C., & Singer, T. (2017). Differential effects of attention, compassion, and socio-cognitively based mental practices on self-reports of mindfulness and compassion. *Mindfulness*, *8*, 1488–1512. <https://doi.org/10.1007/s12671-017-0716-z>
- Hodes, G. E., Kana, V., Menard, C., Merad, M., & Russo, S. J. (2015). Neuroimmune mechanisms of depression. *Nature Neuroscience*, *18*(10), 1386–1393. <https://doi.org/10.1038/nn.4113>
- Hofman, S. G., Grossman, P., & Hinton, D. E. (2012). Loving-kindness and compassion meditation: potential for psychological interventions. *Clinical Psychology Review*, *31*(7), 1126–1132. <https://doi.org/10.1016/j.cpr.2011.07.003.Loving-Kindness>
- Hope, N., Koestner, R., & Milyavskaya, M. (2014). The role of self-compassion in goal pursuit and well-being among university freshmen. *Self and Identity*, *13*(5) <https://doi.org/10.1080/15298868.2014.889032>

- Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., & Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion*, *38*(1), 23–35. <https://doi.org/10.1007/s11031-013-9368-z>
- Johnson, S. L., Leedom, L. J., Muhtadie, L. (2013). The dominance behavioural system and psychopathology: evidence from self-report, observational, and biological studies. *Psychological Bulletin*, *45*(4), 643–652. <https://doi.org/10.1111/j.1469-8986.2008.00652.x>.Cardiac
- Judge, T. A., Bono, J. E., Locke, E. A., Tippie, H. B., & Judge, T. A. (2000). Personality and job satisfaction: The mediating role of job characteristics. *Journal of Applied Psychology*, *85*(2), 237–249. <https://doi.org/10.1037/0021-9010.85.2.237>
- Kelly, A. C., & Carter, J. C. (2015). Self-compassion training for binge eating disorder: A pilot randomized controlled trial. *Psychology and Psychotherapy: Theory, Research and Practice*, *88*(3), 285–303. <https://doi.org/10.1111/papt.12044>
- Kim, J. W., Kim, S. E., Kim, J. J., Jeong, B., Park, C. H., Son, A. R., Song, J. I., & Kim, S. W. (2009). Compassionate attitude towards others' suffering activates the mesolimbic neural system. *Neuropsychologia*, *47*(10), 2073–2081. <https://doi.org/10.1016/j.neuropsychologia.2009.03.017>
- Kirby, J. N., Doty, J. R., Petrocchi, N, Gilbert, P. (2017). The current and future role of gear rate variability for assessing and training compassion. *Frontiers in Public Health*, *5*. <https://doi.org/10.3389/fpubh.2017.00040>
- Kirby, J. N. (2017). Compassion interventions: The programmes, the evidence, and implications for research and practice. *Psychology and Psychotherapy: Theory, Research and Practice*, *90*(3), 432–455. <https://doi.org/10.1111/papt.12104>
- Kirby, J. N., Tellegen, C. L., & Steindl, S. R. (2017). A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behavior Therapy*, *48*(6), 778–792. <https://doi.org/10.1016/j.beth.2017.06.003>

- Koelkebeck, K., Hirao, K., Kawada, R., Miyata, J., Saze, T., Ubukata, S., & Murai, T. (2011). Transcultural differences in brain activation patterns during theory of mind (ToM) task performance in Japanese and Caucasian participants. *Social Neuroscience*, *6*(5–6), 615–626. <https://doi.org/10.1080/17470919.2011.620763>
- Koski, J., Xie, H., & Olson, I. R. (2017). Foundations of Status Perception. *Social Neuroscience*, *10*(5), 527–550. <https://doi.org/10.1080/17470919.2015.1013223>. Understanding
- La Greca, A. M., & Harrison, H. M. (2005). Adolescent peer relations, friendships, and romantic relationships: Do they predict social anxiety and depression? *Journal of Clinical Child and Adolescent Psychology*, *34*(1), 49–61. https://doi.org/10.1207/s15374424jccp3401_5
- Lachmann, B., Sariyska, R., Kannen, C., Blaszkiewicz, K., Trendafilov, B., Andone, I., & Montag, C. (2017). Contributing to Overall Life Satisfaction: Personality Traits Versus Life Satisfaction Variables Revisited—Is Replication Impossible? *Behavioral Sciences*, *8*(1), 1. <https://doi.org/10.3390/bs8010001>
- Lee, K., & Ashton, M. C. (2004). Multivariate behavioral psychometric properties of the HEXACO personality inventory psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research*, *39*, 329–358. <https://doi.org/10.1207/s15327906mbr3902>
- Lovibond, F., & Lovibond, S. H. (1995). The structure of negative emotional states: comparison of the depression anxiety stress scales (DASS) with the Beck Depression Inventory. *Behaviour, Research and Therapy*, *33*(3), 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- Lucre, K. M., & Corten, N. (2013). An exploration of group compassion-focused therapy for personality disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, *86*(4), 387–400. <https://doi.org/10.1111/j.2044-8341.2012.02068.x>
- Lutz, A., Brefczynski-Lewis, J., Johnstone, T., & Davidson, R. J. (2008). Regulation of the neural circuitry of emotion by compassion meditation: effects of meditative expertise. *PLoS One*, *3*(3), 1–10. <https://doi.org/10.1371/journal.pone.0001897>

STRESSED, DEPRESSED, AND RANK OBSESSED

- Madsen, K. S., Jernigan, T. L., Vestergaard, M., Mortensen, E. L., & Baaré, W. F. C. (2018). Neuroticism is linked to microstructural left-right asymmetry of fronto-limbic fibre tracts in adolescents with opposite effects in boys and girls. *Neuropsychologia*, *114*, 1–10. <https://doi.org/10.1016/j.neuropsychologia.2018.04.010>
- Matos, M., Duarte, C., & Duarte, J. (2017). Psychological and physiological effects of compassionate mind training: a pilot randomised controlled study. *Mindfulness*, *8*, 1699-1712. <https://doi.org/10.1007/s12671-017-0745-7>
- Mcewan, K., Gilbert, P., & Duarte, J. (2012). An exploration of competitiveness and caring in relation to psychopathology. *British Journal of Clinical Psychology*, *51*, 19–36. <https://doi.org/10.1111/j.2044-8260.2011.02010.x>
- Mikulincer, M., & Shaver, P. R. (2019). Attachment orientations and emotion regulation. *Current Opinion in Psychology*, *25*, 6–10. <https://doi.org/10.1016/j.copsyc.2018.02.006>
- Milgram, S. (1963). Behavioural study of obedience. *Journal of Abnormal and Social Psychology*, *67*(4), 371–378. <https://doi.org/10.1108/BIJ-03-2016-0039>
- Molenberghs, P., Johnson, H., Henry, J. D., & Mattingley, J. B. (2016). Understanding the minds of others: A neuroimaging meta-analysis. *Neuroscience and Biobehavioral Reviews*, *65*, 276–291. <https://doi.org/10.1016/j.neubiorev.2016.03.020>
- Neff, K. D. (2003). The Development and Validation of a Scale to Measure Self-Compassion. *Self and Identity*, *2*, 223–250. <https://doi.org/10.1080/15298860390209035>
- Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality*, *41*(4), 908–916. <https://doi.org/10.1016/j.jrp.2006.08.002>
- Okwaraji, F. E., Nduanya, C. U., Okorie, A., & Okechukwu, H. E. (2019). Personality traits, happiness and life satisfaction, in a sample of Nigerian adolescents. *The Journal of Medical Research*, *3*(6), 284–289. <https://doi.org/10.31254/jmr.2017.3609>
- Osman, A., Wong, J. L., Bagge, C. L., Freedenthal, S., Gutierrez, P. M., & Lozano, G. (2012). The

STRESSED, DEPRESSED, AND RANK OBSESSED

- depression anxiety stress scales-21 (DASS-21): further examination of dimensions, scale reliability, and correlates. *Journal of Clinical Psychology*, 68(12), 1322–1338. <https://doi.org/10.1002/jclp.21908>
- Pandya, M., Altinay, M., Malone, D. A., & Anand, A. (2012). Where in the brain is depression? *Current Psychiatry Reports*, 14(6), 634–642. <https://doi.org/10.1007/s11920-012-0322-7>
- Perry, A. R., Kane, K. M., Bernesser, K. J., Spicker, P. T. (1990). Type A Behavior, Competitive Achievement-Striving, and Cheating Among College Students. *Psychological Reports*, 66(2), 459–465. <https://doi.org/10.2466/pr0.66.2.459-465>
- Peters, S. K., Dunlop, K., & Downar, J. (2016). Cortico-Striatal-Thalamic Loop Circuits of the Salience Network : A Central Pathway in Psychiatric Disease and Treatment, 10(December), 1–23. <https://doi.org/10.3389/fnsys.2016.00104>
- Price, J., Sloman, L., Gardner, R., Gilbert, P., Rohde, P. (1994). The Social Competition Hypothesis of Depression. *British Journal of Psychiatry*, 164(03), 309–315. <https://doi.org/10.1192/bjp.164.3.309>
- Roelofs, J., Huibers, M., Peeters, F., & Arntz, A. (2008). Effects of neuroticism on depression and anxiety: Rumination as a possible mediator. *Personality and Individual Differences*, 44(3), 576–586. <https://doi.org/10.1016/j.paid.2007.09.019>
- Saleh, D., Camart, N., & Romo, L. (2017). Predictors of stress in college students. *Frontiers in Psychology*, 8(JAN), 1–8. <https://doi.org/10.3389/fpsyg.2017.00019>
- Santini, Z. I., Koyanagi, A., Tyrovolas, S., Mason, C., & Haro, J. M. (2015). The association between social relationships and depression: A systematic review. *Journal of Affective Disorders*, 175, 53–65. <https://doi.org/10.1016/j.jad.2014.12.049>
- Sapolsky, R. M. (1991). Testicular function, social rank and personality amongst wild baboons. *Psychoneuroendocrinology*, 16(4), 281–293.
- Sapolsky, R. M. (2004). Social status and health in humans and other Animals. *Annual Review of Anthropology*, 33(1), 393–418. <https://doi.org/10.1146/annurev.anthro.33.070203.144000>

STRESSED, DEPRESSED, AND RANK OBSESSED

- Sapolsky, R. M. (2005). The influence of social hierarchy on primate health. *Science*, *308*(April), 648.
- Siddaway, A. P., Taylor, P. J., Wood, A. M., & Schulz, J. (2015). A meta-analysis of perceptions of defeat and entrapment in depression, anxiety problems, posttraumatic stress disorder, and suicidality. *Journal of Affective Disorders*, *184*, 149–159. <https://doi.org/10.1016/j.jad.2015.05.046>
- Sloman, L., Atkinson, L., Milligan, K., & Liotti, G. (2002). Attachment, social rank, and affect regulation: Speculations on an ethological approach to family interaction. *Family Process*, *41*(3), 313–327. <https://doi.org/10.1111/j.1545-5300.2002.41304.x>
- Soto, C. J., John, O. P. (2017). The next big five inventory (BFI-2). *Journal of Personality and Social Psychology*, *113*(1), 117–143. <https://doi.org/10.2214/ajr.170.6.9609152>
- Sturman, E. D. (2011). Involuntary subordination and its relation to personality, mood, and submissive behavior. *Psychological Assessment*, *23*(1), 262–276. <https://doi.org/10.1037/a0021499>
- Sturman, E. D., & Mongrain, M. (2008). The role of personality in defeat: a revised social rank model. *European Journal of Personality*, *22*(1), 55–79. <https://doi.org/10.1002/per>
- Sun, J., Kaufman, S. B., & Smillie, L. D. (2018). Unique associations between big five personality aspects and multiple dimensions of well-being. *Journal of Personality*, *314*, 1–46.
- Takano, K., Sakamoto, S., & Tanno, Y. (2011). Ruminative and reflective forms of self-focus: Their relationships with interpersonal skills and emotional reactivity under interpersonal stress. *Personality and Individual Differences*, *51*(4), 515–520. <https://doi.org/10.1016/j.paid.2011.05.010>
- Teo, A. R., Choi, H. J., & Valenstein, M. (2013). Social Relationships and Depression: Ten-Year Follow-Up from a Nationally Representative Study. *PLoS ONE*, *8*(4), 1–8. <https://doi.org/10.1371/journal.pone.0062396>
- Toronchuk, J. A., & Ellis, G. F. R. (2013). Affective neuronal selection: The nature of the primordial emotion systems. *Frontiers in Psychology*, *3*(JAN), 1–16.

<https://doi.org/10.3389/fpsyg.2012.00589>

- Valk, S. L., Bernhardt, B. C., Trautwein, F., Böckler, A., Kanske, P., Guizard, N., Colins, D. L., & Singer, T. (2017). Structural plasticity of the social brain: Differential change after socio-affective and cognitive mental training. *Science Advances*, *3*, 1–12.
- von Hippel, W. (2018). *The Social Leap* (1st ed.). New York: Harper Collins.
- Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C., Rogers, J. M., & Davidson, R. J. (2013). Compassion training alters altruism and neural responses to suffering. *Psychological Science*, *24*(7), 1171–1180. <https://doi.org/10.1177/0956797612469537>
- Wideman, T. H., Zautra, A. J., & Edwards, R. R. (2014). The Neuroscience of Depression: Implications for Assessment and Intervention Manpreet. *Behaviour Research and Therapy*, *154*(11), 2262–2265. <https://doi.org/10.1016/j.pain.2013.06.005.Re-Thinking>
- Wyn, A., Wood, A. M., Maltby, J., Taylor, P. J., & Tai, S. (2014). The prospective role of defeat and entrapment in depression and anxiety: A 12-month longitudinal study. *Psychiatry Research*, *216*, 52–59. <https://doi.org/10.1016/j.psychres.2014.01.037>
- Zuroff, D. C., Fournier, M. A., & Moskowitz, D. S. (2007). Depression, Perceived Inferiority, and Interpersonal Behavior: Evidence for the Involuntary Defeat Strategy. *Journal of Social and Clinical Psychology*, *26*(7), 751–778. <https://doi.org/10.1521/jscp.2007.26.7.751>
- Zuroff, D. C., Moskowitz, D. S., & Côté, S. (1999). Dependency, self-criticism, interpersonal behaviour and affect: Evolutionary perspectives. *British Journal of Clinical Psychology*, *38*(3), 231–250. <https://doi.org/10.1348/014466599162827>