A Preliminary Examination of the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder

And Clinical Research Portfolio

Lara Green

BSc. Psychology with Biology

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Institute of Health and Wellbeing
College of Medical, Veterinary and Life Sciences
University of Glasgow

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Contents

Appendices

Tables and Figures

Chapter 1: Systematic Review

Chapter 2: Major Research Project

Chapter 1: Systematic Review

The Relationship between Self-Compassion and Eating Disorder Symptomatology - A Systematic Review

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Abstract

Self-compassion is increasingly regarded as an important construct within psychological health. While previous reviews have examined self-compassion in relation to general aspects of psychopathology, none have examined this within the context of eating disorders (ED). This systematic review explored 15 articles examining the relationship between self-compassion and ED symptomatology with the hope of extending knowledge into this clinical group. Results across studies largely supported a negative relationship between self-compassion and ED symptomatology, however exceptions were apparent. Discrepancies appeared largely in relation to clinical studies that controlled for covariates or examined the subscales of self-compassion. These findings highlight limitations within the current evidence base and suggest directions for future research. The findings also support a possible role for self-compassion both in the prevention and treatment of EDs.

Key words: eating disorder, self-compassion, systematic review

1. Introduction

1.1 Shame, Self-Criticism and Eating Disorders

Shame is described as a 'self-conscious emotion' arising in response to negative self-reflection and a feeling of inadequacy or failure (Burney & Irwin, 2000). Both clinical and non-clinical studies have highlighted the link between shame and eating disorder (ED) pathology (Goss & Allan, 2009), and levels of shame within EDs have even been suggested to be greater than that of either anxiety or depression (Grabhorn, Stenner, Strangier & Kaufhold, 2006). In addition, ED individuals are also suggested to experience high levels of self-criticism. Self-criticism has been shown to be higher in ED patients compared to healthy matched controls (Speranza *et al.*, 2003) and be associated with increased ED psychopathology in adolescent ED inpatients (Fennig *et al*., 2008).

1.2 Self Compassion and Eating Disorders

Due to the reported link between shame, self-criticism and ED pathology, factors that can protect against or ameliorate these variables may be of benefit in terms of treatment and prevention. Self compassion has been defined as a response to pain or failure that is i) self-kind rather than self-critical; ii) accepting of one's experiences as part of life rather than isolating and iii) involves an attitude of mindfulness rather than over-identification with pain (Neff, 2003a). Given self-compassion directly conflicts with the concepts of self-criticism and shame, it may therefore represent a construct that has protective or mitigating effects against ED symptomatology.

The idea that self-compassion may be protective against shame, self-criticism and mental health difficulties is beginning to gain support within the literature. Research has shown self-compassion to be negatively associated with external shame (Ferreira, Pinto-Gouveia & Duarte, 2013; Pinto-Gouveia, Ferreira & Duarte, 2014), body shame (Breines, Toole, Tu & Chen, 2014; Daye, Webb & Jafari, 2014), self-criticism (Neff, 2003b) and negative affect (Neff, Rude & Kirkpatrick, 2007); and positively associated with optimism, happiness and curiosity (Neff, Rude & Kirkpatrick, 2007). In addition, a meta-analysis concluded that higher levels of self-compassion were associated with lower levels of mental health symptoms and psychopathology (MacBeth & Gumley, 2012). Although studies included in the meta-analysis were not directly related to ED populations, similar findings are

beginning to emerge, with suggestions that self-compassion may also be protective against ED symptomatology (Kelly, Vimalakanthan & Miller, 2014).

1.3 Therapies Aimed at Improving Self-Compassion

In response to the above, therapies that foster self-compassion are beginning to materialise; e.g. Compassion Focussed Therapy (CFT; Gilbert, 2010), Acceptance and Commitment Therapy (ACT; Hayes, Strosahl & Wilson, 1999), Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams & Teasdale, 2002) and Dialectical Behavioural Therapy (DBT; Linehan, 1993). These third wave therapies, to varying degrees, each draw upon the beneficial aspects of self-compassion, and research is beginning to support their use in a variety of psychological difficulties, including EDs.

CFT was developed as an intervention to target shame, self criticism and self-directed hostility. The aim is to address and improve the practice of self-compassion and support individuals to: i) be open to helpfulness and compassion from others; ii) be helpful and compassionate towards oneself, and iii) develop an encouraging, supportive and compassionate approach to oneself (Gilbert, 2012). Preliminary CFT research within EDs has been positive, with results suggesting it may have the ability to lower symptomatology. For instance, using a repeated-measures design, Gale, Gilbert, Read & Goss (2014) examined the impact of introducing CFT to a 20-week cognitive-behavioural programme for EDs. The study observed 99 individuals undertaking the combined treatment and results showed it to be associated with decreased ED symptomatology. While the study did not make use of a control group, and therefore no conclusion can be made regarding the added benefits of CFT, anecdotal evidence suggested that individuals understood its value and could see the benefits.

ACT, MBCT, and DBT also promote the development of self-compassion as part of their treatment aims. These therapies implicitly encourage self-compassion through developing self-acceptance, reducing the impact of self-critical thinking, adopting a non-judgmental viewpoint, and developing an attitude of mindful awareness (Kristeller, Baer & Quillian-Wolever, 2006). Preliminary research supports the use of such therapies in ED populations (Atkinson & Wade, 2016; Juarascio *et al*. 2013; Masson,VonRanson, Wallace & Safer, 2013), however more needs to be done to assess their effectiveness- including the use of randomised controlled trials.

1.4 Present Review

Despite the link between self-compassion and psychological wellbeing, little has been done to explore this construct within EDs. This systematic review consequently seeks to address this gap and answer the question: is there a relationship between self-compassion and ED symptomatology?

2. Methodology

2.1 Inclusion and Exclusion Criteria

As the field of self-compassion and EDs is relatively new, search criteria were kept broad. Studies meet the following inclusion criteria: (1) published in an English peer-reviewed journal; (2) examined the relationship between self-compassion and ED symptomatology in clinical or non-clinical populations (defined either through DSM-IV, DSM-V or ICD-10 diagnostic criteria; see appendix B for included diagnoses). Exclusion criteria were: (1) treatment studies explicitly manipulating self-compassion; (2) studies looking at the relationship between self-compassion and body image in non-ED related mental or physical health problems. These studies were excluded so as to provide a concise overview of self-compassion in relation to EDs, without the influence of body-related trauma or other psychopathological constructs.

Following the initial search, it was evident that a large number of findings were reported in the articles included for review. It was therefore necessary to refine the inclusion criteria further in order to focus the review on a more discreet area of research. Consequently, the present review looked specifically at the relationship between self-compassion and ED symptoms related to diagnostic criteria. The following individual constructs were considered to represent ED symptomatology: food restraint, weight concern, eating concern, shape/body concern, drive for thinness, body-image dissatisfaction and binging and purging behaviours. Studies making reference to global ED pathology as well as these variables were therefore included in the review. (See appendix C for diagrammatic view of how diagnostic constructs were selected).

2.2 Search Strategy

A systematic search was conducted using the Ovid and EBSCO platforms. The following databases were included: MEDLINE, PsycINFO, CINAHL, AMED, EMBASE, Psychology and Behavioural Sciences Collection, Journals@Ovid and NHS Scotland Journals@Ovid.

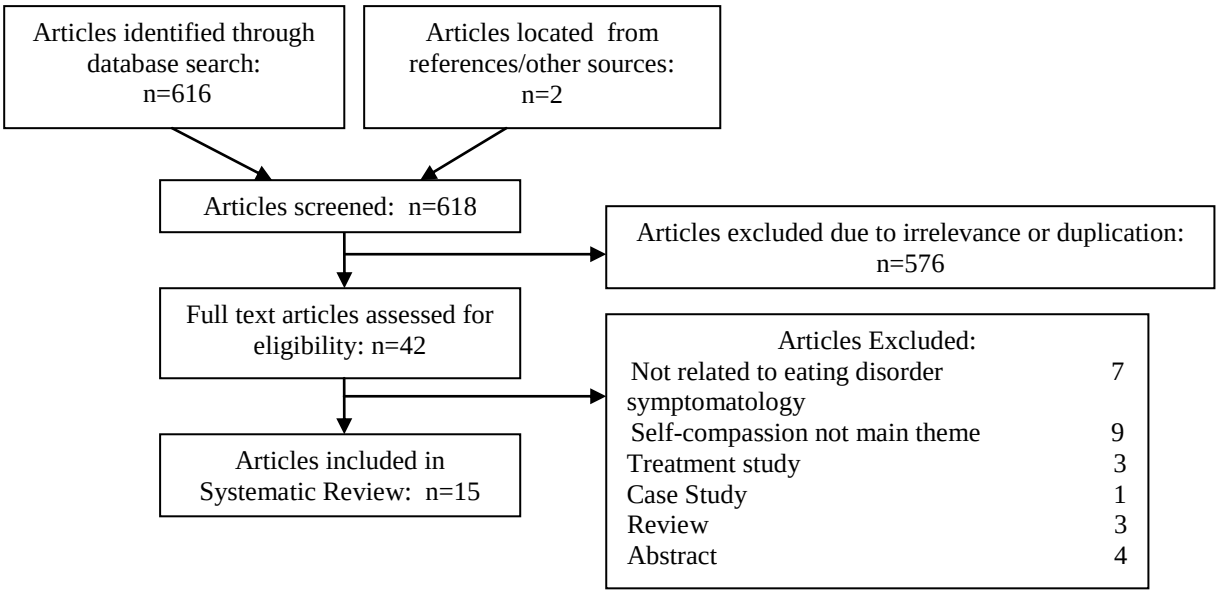
The search strategy was discussed and agreed upon by the author and NHS Lanarkshire librarian. The search included various terms for EDs and self-compassion (see

appendix D for search strategy), and was carried out from the earliest date possible (according to each database) until 3rd March 2016.

2.3 Study Selection

Following the electronic search, the title and abstract of each study was scanned for relevance and duplicates removed. Full texts were obtained for those which appeared relevant and these were reviewed in line with the inclusion and exclusion criteria. The reference list of each selected study was also searched. *See figure 1*.

Figure 1: *Flow diagram illustrating search strategy*



2.4 Assessment of Study Quality

The Quality Appraisal Checklist for Quantitative Studies Reporting Correlations and Associations was employed to assess the quality of included studies. The checklist was developed by the National Institute for Health and Care Excellence (NICE) as an effective method of assessing the internal and external validity of quantitative studies (NICE, 2012). For a full description of the study tool, including scoring, see appendix E. Each article was reviewed in line with the tools guidelines and an average score for internal and external validity was achieved (see table 1 for each study's ratings). A study's external validity score was rated across three items (e.g. is the source population well described; is the eligible population representative of the source population); and internal validity score across 16

items (with questions concerning methodology, outcomes, analysis and summary). An overview of the main strengths and limitations that arose from the appraisal process are discussed further in section 3.1.

To ensure inter-rater reliability, a sample of the included articles were independently rated by a colleague. Due to time-constraints only 60% of the articles were reviewed by the second rater; however following discussion there was a 100% agreement in scores suggesting consistency within ratings.

3. Results

3.1 Quality Appraisal

3.1.1 Sample Characteristics

Fifteen studies were included in the review (*table 1*). All studies utilised relatively homogeneous samples of Caucasian females, with a mean age range of 18-28 (SD range=1.0-9.6). Five studies included males, however numbers were low (ranging from 3-22%). While the gender ratio appears consistent with clinical ED populations, the age range is skewed towards younger individuals and may not therefore represent the diversity of individuals seen by services. It is also useful to note that twelve of the studies looked at EDs as a unitary group, while three broke populations down to examine specific diagnoses and subgroups. This is a potential limitation with the current research base as there has been little examination of whether there are unique differences between diagnostic groups with regards to the relationship between self-compassion and ED pathology. Seven of the twelve studies using non-clinical samples also recruited students which may bias findings in terms of educated individuals. Finally all of the studies looked at populations in the Western world (America, Canada, Portugal). While these hold utility when thinking about UK populations, caution should be taken when relating findings.

Due to an 'opt-in' method of recruitment, each study is also subject to self-selection/volunteer bias. Self-selection can make determining causation more difficult given the possibility of inherent bias in the characteristics of participants. This is important to take into consideration when interpreting findings.

3.1.2 Study Design

A significant limitation was the frequent use of self-report measures. The reliance on these may increase the risk of inaccurate reporting through errors in self-observation, recall bias or social desirability bias. This may have been particularly evident in student samples where participants completed measures in the company of teachers or peers. In addition, only one study controlled for order-effect bias (Wasylkiw, MacKinnon & MacLellan, 2012). While authors concluded that outcomes did not differ as a function of questionnaire ordering, it is worth being mindful of when interpreting findings.

3.1.3 Measure of Self-compassion

All studies measured trait self-compassion with the Self-Compassion Scale (SCS; Neff, 2003b; appendix F). Eight studies used the complete 26-item scale. This measure shows good internal consistency, construct validity, and good 3-week test-retest reliability (Neff, 2003b). Six studies used the 12-item short-from (SCS-SF) and research has shown it to be a valid measure of self-compassion, correlating strongly with scores on the SCS (Raes *et al*. 2011). One study used a modified version of the SCS and SCS-SF (Breines *et al*., 2014); incorporating 10-items and 6-items accordingly, and rewording questions to represent a measure of appearance-related self-compassion. While authors report good internal consistency for both scales (α=0.79; α=0.69), there is no mention of test validity, i.e. that the adapted scale is an appropriate measure of appearance-related self-compassion. In addition, results are less directly comparable to other findings.

Only three studies examined self-compassion in relation to its subscales. Two explored the six-factor model of the SCS (Geller *et al*. 2015; Wasylkiw *et al*. 2012) and one used the two-factor model of the SCS (Ferreira *et al*. 2014).

3.1.4 Data sets

Notably, four studies were published by the same research group in Portugal and five from the same research group in Canada. As such there may be increased risk of researcher confirmation bias. Similarly, many used the same sample populations- two of the four Portuguese studies used the same sample (Ferreira *et al*. 2013; Pinto-Gouveia *et al*. 2014), and all five of the Canadian studies showed some cross-over in sample populations (Kelly *et al*. 2013; Kelly & Carter, 2014; Kelly, Carter & Borairi, 2014; Kelly, Vimalakanthan & Carter, 2014; Kelly, Vimalakanthan & Miller, 2014). While this can be useful for increasing validity, it may also reduce generalisability.

3.1.5 Controlling for Confounding Variables

Eight studies controlled for demographic variables. Additional confounding variables known to be associated with self-compassion are: self-esteem (r=.71, Wasylkiw *et al*. 2012), BMI (r=-.22, Taylor *et al*. 2015); depression, anxiety and stress (mean r-value=-0.52, -0.51, -0.54 respectively, MacBeth & Gumley, 2012). In order to examine the unique contribution of self-compassion, research therefore needs to control for these. One study controlled for both self-esteem and BMI (Kelly, Vimalakanthan & Carter, 2014); three for self-esteem only (Breines *et al*. 2014; Kelly, Vimalakanthan & Miller, 2014; Wasylkiw *et al*. 2012); two for

BMI only (Geller *et al*. 2015; Kelly & Carter, 2014) and none for depression, anxiety or stress. When interpreting current results it is therefore important to be mindful of these factors and their potential for influence.

3.2 Review of Literature

See *table 1* for an overview of included studies, and appendix G for a diagrammatic overview of findings.

3.2.1 Self-compassion and Global Eating Disorder Pathology

Clinical

Five studies looked at the relationship between self-compassion and global ED pathology in clinical samples. In a series of three cohort studies, authors observed self-compassion over 12 weeks of treatment-as-usual (TAU). Results found that baseline self-compassion was negatively associated with fear of self-compassion (Kelly *et al*. 2013) and ED pathology, but was not related to ED diagnosis (Kelly & Carter, 2014). Over the 12 weeks, all diagnostic groups showed significant decreases in symptomatology, however improvements were slower for those with AN (both the binge-purge, AN-BP, and restrictive subtype, AN-R) compared to BN or Eating Disorder Not Otherwise Specified (EDNOS). A similar pattern was also seen for improvements in self-compassion, e.g. significant improvements were seen in individuals with BN and EDNOS, but not AN-BP or AN-R (Kelly & Carter, 2014). In addition, Kelly, Carter & Borairi (2014) found that individuals who had large or moderate increases in self-compassion early in treatment (i.e. within first 4 weeks) showed significantly greater decreases in pathology. Finally, multilevel modelling found the three-way interaction between self-compassion, fear of self-compassion and time to be a significant predictor of ED symptom change over 12 weeks (Kelly *et al*. 2013). Authors concluded that a combination of low self-compassion and high fear of self-compassion was associated with no symptom change, whereas each of the three other combinations were all related to significant symptom reduction.

Only one clinical study controlled for possible confounding variables. Kelly, Vimalakanthan & Carter (2014) found that, when controlling for BMI and self-esteem, self-compassion was not a significant predictor of global ED pathology, however fear of self-compassion was. Compared to measures of BMI, self-compassion and self-esteem, fear of self-compassion was reported to be the strongest predictor of global ED pathology.

Table 1: overview of studies

Authors	Study Quality	Location	Sample	Study Design	Outcome Variables	r-value/ β-value	p-value	Measure of Self-compassion	Main Findings
Breines, Toole, Tu & Chen (2014)	IV + EV +	USA	Study 1: 95 female undergraduates (mean age=20.1, SD=1.84)	Diary study	• Disordered eating	B =-.09	p<.001	SCS - adapted	Days of higher body-related self-compassion were associated with lower levels of disordered eating.
			Study 2: 158 female undergraduates (mean age=20.8, SD=3.86)	cross-sectional/lab-based	• Anticipated disordered eating • Lab-based restrained eating - weight concern -self-punishment	b=-.41 b=-.35 b=-.34	p<.001 p<.005 p<.005	SCS-SF-adapted	Body-related self-compassion predicted lower anticipated disordered eating. In individuals who engaged in food restriction, when controlling for self-esteem, self-compassion was also associated with lower weight concern and lower self-punishment motives for restriction.
Duarte, Ferreira, Trindade & Pinto-Gouveia (2015	IV + EV +	Portugal	662 female college students (mean age=20.3, SD=1.76)	Cross-sectional	• Body-image dissatisfaction	r=-.18	p<.001	SCS - Portuguese version	Body-image dissatisfaction was negatively associated with self-compassion.
Ferreira, Matos, Duarte & Pinto-Gouveia (2014)	IV + EV +	Portugal	34 female ED patients (mean age=24.6, SD=7.61)	Cross-sectional	• ED symptomatology	r=-.61	p< .001	SCS - Portuguese version Subscales: 2-factor model	Only the positive dimension of self-compassion significantly predicted ED pathology.
Ferreira, Pinto-Gouveia & Duarte (2013)	IV + EV++	Portugal	102 female ED patients (mean age=23.6, SD=7.42) 123 females from general population (mean age=23.5,	Cross-sectional	• Disordered eating - drive for thinness - bulimia - body dissatisfaction • Disordered eating	r=-.47 r=-.34 r=-.42	p< .05 p< .05 p< .05	SCS - Portuguese version	Self-compassion scores were significantly lower in ED patients compared to the general population. Self-compassion was negatively associated with drive for thinness, bulimic symptoms and body image dissatisfaction both in clinical and non-clinical samples.

Authors	Study Quality	Location	Sample	Study Design	Outcome Variables	r-value/ β-value	p-value	Measure of Self-compassion	Main Findings
			SD=3.19)		- drive for thinness - bulimia - body dissatisfaction	r=-.32 r=-.21 r=-.34	p< .001 p< .05 p< .001		
Geller, Srikameswaran & Zelichowska (2015)	IV ++ EV ++	Canada	131 females from general population (mean age=28.8, SD=8.45)	Cross-sectional	• Body shape concern • Body esteem - weight concern - physical concern • Disordered eating • ED symptomatology	r= -0.39 r=0.40 r=0.42 r=-0.30 r=-0.33	p<.001 p<.001 p<.001 p<.001 p<.001	SCS Subscales-six-factor model	Self-compassion was negatively associated with global ED pathology as well as weight concern, shape concern and physical concern. When controlling for BMI and age, only the Over-Identification subscale was a significant predictor of disordered eating. The Self-Judgement subscale significantly predicted shape concern, and the Self-kindness subscale significantly predicted both weight and physical concerns.
Kelly & Carter (2014)	IV + EV ++	Canada	89 ED patients (mean age=28, SD=9.6) 97% female	Cohort	• ED symptomatology - global - restraint - weight concern - shape concern - eating concern	 r=-0.45 r=-0.29 r=-0.43 r=-0.43 r=-0.47	 p<.001 p<.05 p<.001 p<.001 p<.001	SCS-SF	At baseline, patients across diagnostic groups did not differ with regards to levels of self-compassion. Baseline self-compassion was significantly associated with global ED pathology as well as dietary restraint, weight concern, shape concern and eating concern. Over 12 weeks of treatment, patients with AN-BP and AN-R had slower improvement rates in self-compassion than those with EDNOS or BN.
Kelly, Carter & Borairi (2014)	IV ++ EV +	Canada	97 ED patients (mean age=28, SD=9.6) 97% female	Cohort	• Baseline ED symptomatology • ED symptom change - 4weeks • ED symptom change - 12weeks and high self-compassion • ED symptom change - 12weeks	r=-0.14 r=0.00 B=-.20 B=-.13	No sig No sig P<.001 P<.05	SCS-SF	Greater increases in self-compassion early in treatment were associated with greater decreases in ED symptoms over 12 weeks.

Authors	Study Quality	Location	Sample	Study Design	Outcome Variables	r-value/ β-value	p-value	Measure of Self-compassion	Main Findings
					and moderate self-compassion				
Kelly, Carter, Zuroff & Borairi (2013)	IV ++ EV+	Canada	74 ED patients (mean age=27.5, SD=9.3) 97% female	Cohort	• ED symptomatology • Fear of self-compassion	r=-0.59 r=-0.63	p<.001 p<.001	SCS-SF	In ED patients, lower self-compassion was associated with greater fear of self-compassion and greater global ED pathology . Fear of self-compassion was also related to more severe ED pathology. Patients who had lower self-compassion combined with higher fear of self-compassion had no significant changes in ED symptoms over 12 weeks.
Kelly, Vimalakanthan & Carter (2014)	IV + EV ++	Canada	155 female undergraduates (mean age=20, SD=5.0) 97 ED patients (mean age=28, SD=9.6)	Cross-sectional	• ED symptomatology - global - restraint - eating concerns - weight concerns - shape concerns • ED symptomatology - global - restraint - eating concerns - weight concerns - shape concerns	 β=-.50 β=-.42 β=-.27 β=-.65 β=-.65 β=.16 β=.22 β=.14 β=.15 β=.13	 p<.001 p<.01 p<.05 p<.001 p<.001 no sig no sig no sig no sig no sig	SCS-SF	ED patients had lower self-compassion and greater fear of self-compassion than students. When controlling for BMI and self-esteem, self-compassion was a significant predictor of global ED pathology, weight concern, shape concern, eating concern and dietary restraint in the non-clinical group, but not in the clinical group. Higher fear of self-compassion was found to be the strongest predictor of ED pathology in the ED group, whereas low self-compassion was the strongest predictor of ED pathology in the student group.
Kelly, Vimalakanthan & Miller (2014)	IV + EV +	Canada	153 female undergraduates (mean age=20.2, SD=3.49)	Cross-sectional	• ED symptomatology - global - restraint - eating concerns - weight concerns - shape concerns	 r=-.41 r=-.29 r=-.32 r=-.4 r=-.44	 p<.001 p<.001 p<.001 p<.001 p<.001	SCS	When controlling for self-esteem, self-compassion was negatively associated with global ED pathology, weight concern, shape concern, eating concern and dietary restraint.

Authors	Study Quality	Location	Sample	Study Design	Outcome Variables	r-value/ β-value	p-value	Measure of Self-compassion	Main Findings
Pinto-Gouveia, Ferreira & Duarte (2014)	IV + EV +	Portugal	123 females from general population (mean age=23.5, SD=6.89) 102 ED patients (mean age=23.6, SD=7.42)	Cross-sectional	• Body dissatisfaction • Drive for thinness	r=-.57 r=-.63	p<.01 p<.01	SCS - Portuguese version	Self-compassion was negatively associated with body dissatisfaction and drive for thinness.
Taylor, Daiss & Krietsch (2015)	IV + EV +	USA	150 undergraduates (mean age=19.2, SD=1.5) 85% female	Cross-sectional	• Disordered eating - global - dieting - bulimia/food preoccupation - oral control	 r=-.17 r=-.23 r=-.11 r=.09	 p<.05 p<.01 no sig no sig	SCS-SF	Self-compassion negatively predicted ED symptomatology. Negative associations were also found between self-compassion and BMI, and between self-compassion and measures of dieting, bulimia/food preoccupation, and oral control.
Tylka, Russell & Neal (2015)	IV + EV +	USA	435 females from general population (mean age=28.1, SD=5.45)	Cross-sectional	• Disordered eating	r=-.39	p<.001	SCC-SF	Self-compassion was negatively associated with global measures of ED symptomatology.
Wasylkiw, MacKinnon & MacLellon (2012)	IV + EV ++	Canada	Study 1: 142 female undergraduates (mean age=19, SD=1.13) Study 2: 187 female undergraduates (mean age=18.4, SD=1.04)	Cross-sectional	• Weight concern • Body preoccupation • Restricted eating	r=.48 r=-.49 r=-.12	p<.01 p<.01 no sig	SCS Subscales-six-factor model	Increased self-compassion was associated with fewer weight concerns. In addition, each subscale of self-compassion was also significantly associated with measure of weight concern. When controlling for self-esteem, self compassion was not associated with restrained eating.

Authors	Study Quality	Location	Sample	Study Design	Outcome Variables	r-value/ β-value	p-value	Measure of Self-compassion	Main Findings
Webb & Forman (2013)	IV + EV ++	USA	215 undergraduates (mean age=19.8, SD=1.48) 78% female	Cross-sectional	• Binge eating	r=-0.21	p<.01	SCS	Self-compassion was negatively associated with binge-eating severity.

IV- internal validity; EV- external validity
Scoring of study quality: '++' = study conducted in such a way as to minimise risk of bias, '+' = study information is not clear, or study may not have addressed all potential sources of bias, '-' = significant sources of bias may persist (NICE, 2012)
Notes: ED= eating disorder; BMI= body mass index; SCS= Self-compassion Scale; SCS-SF= self-compassion scale short-form, no sig=no significance

A final study examined self-compassion in relation to its subscales. Ferreira *et al*. (2014) used the two-factor model of the SCS, exploring self-compassion in relation to its negative and positive dimensions. Hierarchical regression analysis found that only the positive dimension was a significant predictor of ED pathology.

Non-Clinical

Six studies examined self-compassion and global measures of ED pathology in non-clinical samples. Both Taylor *et al*. (2015) and Tylka, Russell & Neal (2015) concluded that self-compassion was significantly and negatively associated with global measures of ED pathology. Regression analysis further found self-compassion to negatively predict ED symptomatology (Taylor *et al*., 2015).

Four out of the six non-clinical studies included analyses that controlled for possible confounding variables. Kelly, Vimalakanthan & Carter (2014) found that, when controlling for BMI and self-esteem, self-compassion remained a significant predictor of global ED pathology. Self-compassion was also reported to be the strongest predictor of ED pathology in comparison to measures of BMI, self-esteem and fear of self-compassion. Kelly, Vimalakanthan & Miller (2014) found similar results, reporting a significant negative relationship between self-compassion and global ED pathology when controlling for self-esteem. Finally, Breines *et al*. (2014) found that, when controlling for self-esteem, on days where females expressed higher levels of appearance-related self-compassion, they reported lower levels of disordered eating behaviours. During a lab-based assessment of restrained eating, authors found body-related self-compassion to be negatively associated with anticipated disordered eating behaviours.

The final study controlled for BMI and age whilst also examining the six subscales of the SCS. While initial results showed that global self-compassion significantly predicted measures of ED symptomatology; subsequent step-wise regressions found that the Over-Identification scale accounted for the additional explained variance in ED scores (Geller *et al*, 2015). This finding suggests that, in particular, it may be an increased tendency for rumination that is associated with ED symptomatology.

3.2.2 Self-compassion and Eating Disorder Symptomatology

Clinical

Based on ED diagnostic criteria, the following individual constructs were considered to represent ED symptomatology: food restraint/oral control, weight concern, eating concern, shape/body concern, body preoccupation, drive for thinness, body-image dissatisfaction and binging and purging behaviours (appendix C). Three studies looked at the relationship between some, or all, of these constructs and self-compassion within clinical populations.

Ferreira *et al*. (2013) found a significant negative association between self-compassion and drive for thinness, bulimic symptoms and body-image dissatisfaction. Significant negative associations have also been found between self-compassion and dietary restraint, weight concern, shape concern and eating concern across all diagnostic groups (Kelly & Carter, 2014). Following 12 weeks of TAU, improvements in shape concern were seen in individuals with BN and EDNOS, but not AN-BP or AN-R; and improvements in dietary restraint were seen across diagnoses, but were much slower in those with AN-BP. This pattern of symptom change appears to mirror that of self-compassion change; i.e. significant improvements were seen in individuals with BN and EDNOS, but not in AN-BP and AN-R.

In contrast, Kelly, Vimalakanthan & Carter (2014) found that, when controlling for BMI and self-esteem, self-compassion was not in fact a significant predictor of dietary restraint, eating concern, weight concern or shape concern. Instead, fear of self-compassion was significantly and positively related to each.

Non-Clinical

Ten non-clinical studies examined the relationship between self-compassion and ED diagnostic criteria. Ferreira *et al*. (2013) found significant negative relationships between self-compassion and drive for thinness, bulimic symptoms and body-image dissatisfaction. A similar negative relationship between body-image dissatisfaction and self-compassion was recorded by Duarte, Ferreira, Trindade & Pinto-Gouveia (2015). Negative associations between self-compassion and measures of dieting, bulimia/food preoccupation, and oral control have also been reported (Taylor *et al*. 2015). Similarly Webb & Forman (2013) reported a negative association between self-compassion and binge-eating severity.

Five studies examined these relationships while controlling for confounding variables. Kelly, Vimalakanthan & Miller (2014) controlled for self-esteem while Kelly, Vimalakanthan & Carter (2014) controlled for BMI and self-esteem. Both studies found self-compassion to be negatively associated with measures of dietary restraint, eating concern, weight concern and shape concern. Regression analysis further supported self-compassion as a significant predictor of each of these variables (Kelly, Vimalakanthan & Carter, 2014). In line with this, Breines *et al*. (2014) found self-compassion to be negatively associated with weight concern and self-punishment motives for restricted eating when controlling for self-esteem.

In addition to controlling for confounding variables, two studies examined the subscales of self-compassion (both using the six-factor model). Wasylkiw *et al*. (2012) found all subscales to be significantly associated with weight concern and body preoccupation, however only the Self-judgement scale was a significant predictor of body preoccupation. Similar results regarding the unique contribution of individual subscales was shown by Geller *et al*. (2015). When controlling for BMI and age, initial results showed that global self-compassion significantly predicted measures of weight, physical and shape concern. However, subsequent step-wise regressions found that the Self-Kindness and Self-Judgement scales accounted for the additional explained variance in scores. In particular, Self-Judgement significantly predicted shape concern, and Self-Kindness predicted weight and physical concern.

Combined

One study utilised a mixed-population of both ED patients and those from the general population. Pinto-Gouveia *et al*. (2014) looked at the relationship between self-compassion and both body dissatisfaction and drive for thinness. Results found self-compassion to be negatively associated with both variables.

4. Discussion

It is clear global ED pathology and many of its diagnostic constructs show negative associations with self-compassion. This is consistent with MacBeth & Gumley's (2012) meta-analysis concluding that higher levels of self-compassion were associated with lower levels of depression, anxiety and stress. The current review therefore adds to the self-compassion literature by expanding these findings to ED populations.

In response to the question 'is there a relationship between self-compassion and ED symptomatology', results would therefore suggest that there is. The nature and extent of this relationship is, however, less straightforward. Current research within the field remains limited and more needs to be done both to replicate and expand on these findings. In particular, more research using clinical populations would be advantageous. Current findings suggest that the relationship between self-compassion and ED symptomatology may differ between clinical and non-clinical populations. For instance, self-compassion is suggested to be the strongest predictor of ED symptomatology in non-clinical populations; whereas fear of self-compassion the strongest predictor in clinical populations (Kelly, Vimalakanthan & Carter, 2014). Similarly, when controlling for self-esteem and BMI, self-compassion emerged as a significant predictor of ED symptomatology in non-clinical populations (Breines *et al*. 2014; Kelly, Vimalakanthan & Carter, 2014; Kelly, Vimalakanthan & Miller, 2014); but not in clinical populations (Kelly, Vimalakanthan & Carter, 2014).

This variation may highlight unique aspects of clinical utility. At present, results suggest that among non-clinical populations, greater self-compassion is associated with less ED pathology. This finding may be beneficial when thinking about ED prevention and health promotion. For instance, it is possible that increased levels of self-compassion among the general population may help protect against the development of EDs. This hypothesis has been suggested within other psychopathologies (Trompetter, deKleine & Bohlmeijer, 2016) and would therefore be an important area of focus for future ED research. In clinical populations, the relationship between self-compassion and ED symptomatology is less conclusive. Particularly, it appears as if the role of self-esteem and BMI may be more pronounced and influential. In the first instance, more research is required to further extrapolate findings; ensuring to control for confounding variables. Secondly, the idea that fear of self-compassion may be a better predictor of ED symptomatology is worth further

investigation. This suggests that interventions designed to increase levels of self-compassion, such as CFT (Gilbert, 2010), may be hindered by a patients fear of self-compassion. Such interventions would therefore need to be mindful of this relationship and incorporate strategies to manage it in order to be effective.

The nature of the relationship between self-compassion and ED symptomatology is further complicated by the inconsistent use of the SCS; in particular the uncertainty around the measures factorial structure. Neff's (2003b) original scale proposed scores for global self-compassion as well as six subscales (self-kindness, self-judgement, common-humanity, self-isolation, mindfulness and over-identification). Recent research using confirmatory factor analysis however has failed to replicate the validity of this structure (Costa *et al*. 2015; Lopez *et al*. 2015); instead supporting a two-factor model, comprising a positive and negative subscale. In response, Neff (2016) has defended his original model stating that the two-factor structure is insensitive to the unique, dynamic components of self-compassion. Given the current debate, it is difficult to interpret the validity of each model. Further work to explore the factorial structure of the SCS is therefore imperative. With regards to the current review, the inclusion of subscales does suggest that the relationship between self-compassion and ED symptomatology is likely more abstruse. For instance, using the six-factor structure, results suggest Over-identification to be a better predictor of disordered eating; Self-judgement to be a significant predictor of shape concern and body-preoccupation; Self-kindness to predict weight and physical concern; and the positive dimension of self-compassion to significantly predict ED pathology (Ferreira *et al*. 2014; Geller *et al*. 2015; Wasylkiw *et al*. 2012). These findings highlight the complexity of the relationship between self-compassion and ED pathology and suggest that measures of global self-compassion may be insensitive to detecting underlying effects. While results do therefore support a general negative association between self-compassion and ED pathology, the relationship may be better explained by discrete levels of Self-judgment, Self-kindness and Over-identification. This avenue of research should be encouraged as it may provide additional information regarding individual aspects of self-compassion and the role they play within ED pathology.

Lastly, due to the heavy reliance on cross-sectional studies, the temporal nature of the relationship remains unclear. For instance, high levels of self-compassion may protect against ED symptoms, or, low levels of ED pathology may help facilitate self-compassion (a difficulty also highlighted in the review by MacBeth & Gumley, 2012). Longitudinal studies

examining changes in self-compassion and psychopathology are therefore needed to understand the directionality of this relationship.

4.1 Clinical Implications

Current findings have important implications for both ED prevention and treatment. Provisional support for the role of self-compassion in ED prevention comes from two non-clinical studies. Albertson *et al*. (2014) found that introducing self-compassion podcasts to females resulted in decreased body shame, body dissatisfaction and appearance related self-worth, and increased body appreciation. Adams & Leary (2007) found encouraging individuals to think self-compassionately following an unhealthy food preload reduced distress and attenuated further eating. Both studies suggest self-compassion may protect against ED symptomatology, and provide preliminary evidence for the clinical utility of self-compassion in the prevention of ED development.

Similarly, with regards to ED treatment, research is beginning to acknowledge the benefits of fostering self-compassion. Gale *et al*. (2014) examined the effect of introducing CFT to a standard cognitive-behavioural programme for EDs. Treatment outcomes reported significant improvements in self-esteem, self-directed hostility, general well-being and both AN and BN cognitions and behaviours. Similarly, Kelly & Carter (2015) compared CFT to a standard behavioural intervention for binge-eating disorder. Results found CFT was associated with greater reductions in global ED pathology, as well greater improvements in weight and eating concerns. These studies provide preliminary support for the beneficial role of self-compassion in ED intervention. Research is, however, still in its infancy and additional study is required; particularly the use of randomised controlled trails.

4.2 Review Limitations

The current review focussed only on the relationship between self-compassion and ED pathology related to diagnostic criteria. There are of course numerous other constructs associated with EDs, e.g. shame, and many of the included studies also looked at the relationship between self-compassion and these variables. Due to the scope of this review however, it was not possible to include them. In addition, the review focussed solely on associations. Many of the studies went beyond this basic level of analysis and examined self-compassion within a moderating/mediating role. While the current review is helpful in providing an initial exploration of the relationship between self-compassion and ED

symptomatology, additional findings will be beneficial for providing a more in-depth account of the role of self-compassion.

Whilst in the process of writing this review, Braun, Park & Gorin (2016) published a systematic review also exploring self-compassion and disordered eating. This article provides a much broader review of the literature, including articles related to exercise, adaptive eating, breast cancer surgery as well as intervention studies (n=28). The review covers four key areas; associations between self-compassion and ED pathology, self-compassion as a protective factor against ED risk factors, self-compassion as a buffer against ED related outcomes, and intervention studies targeting self-compassion and ED-related outcomes. The current review provides additional support to that of Braun and colleagues, and offers a more synthesised review of self-compassion with regards to ED diagnostic constructs. The current review also includes an additional article not covered by Braun *et al*. (2006), (Geller *et al*., 2015), however the reasons for this being omitted are unclear.

5. Conclusion

Findings largely suggest higher levels of self-compassion to be associated with fewer ED symptoms. Some anomalies to this were reported and there is therefore a need for future research to replicate findings in clinical populations, control for covariates, and take into account the influence of self-compassion subscales. Given the preliminary findings, the direction of research should also aim to explore the benefits of self-compassion both in prevention and treatment of EDs.

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Chapter 2: Major Research Project

A Preliminary Examination of the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder

Prepared in accordance with guidelines for submission to European Eating Disorders Review (Appendix A)

Word count: 7,118

Plain English Summary

1. Background

Research has shown that individuals with an eating disorder (ED) frequently engage in unhelpful exercise, often referred to as compulsive exercise. As well as being a method of weight loss, it has also been suggested that compulsive exercise may help individuals manage their emotions. One emotion that is common in EDs is shame. However, no study has looked at the relationship between compulsive exercise and shame in ED populations. The aim of the current study is therefore to explore the relationship between shame and compulsive exercise in individuals with an ED.

2. Method

Participants were recruited from mental health teams across Scotland. Twenty-one individuals took part in the study. Each participant completed a series of online questionnaires that asked about their thoughts and behaviours towards exercise, as well as feelings of shame, depression and anxiety.

3. Results

Results showed that levels of internal shame (i.e. the degree to which one thinks negatively about themselves) were related to levels of compulsive exercise. In particular, individuals with high levels of internal shame also had higher levels of compulsive exercise. There was no difference between levels of shame or levels of compulsive exercise between individuals with a diagnosis of Anorexia-Nervosa and Bulimia-Nervosa.

4. Discussion

A number of suggestions to explain the relationship between internal shame and compulsive exercise can be made. First it is possible that compulsive exercise is used to reduce the amount of shame felt by individuals. Second, individuals with high levels of internal shame may be more likely to show compulsive exercise as an attempt to burn calories and reduce fears around weight gain. Third, it is possible that individuals who show compulsive exercise feel ashamed by their exercise habits and therefore feel more internal shame. These suggestions need to be explored further in order to understand the exact role of compulsive exercise.

Abstract

Objective: To explore the relationship between compulsive exercise and shame in a clinical sample of eating disorder patients.

Method: In a cross-sectional study, individuals with an eating disorder (n=21) completed self-report measures of compulsive exercise, internal shame, external shame, bodily shame, anxiety and depression.

Results: Internal shame was moderately associated with compulsive exercise ($r=.496$, $p<.05$). No further variables were significantly related to compulsive exercise. Individuals with Anorexia-Nervosa and Bulimia-Nervosa did not significantly differ on any of the study variables.

Discussion: Hypotheses regarding the possible nature of the relationship between compulsive exercise and shame are suggested. For instance, that compulsive exercise may serve a role in the regulation of internal shame. That compulsive exercise may act as a compensatory behaviour and be a consequence of high levels of shame. Or that internal shame may result as a response to negative perceptions of one's exercise habits. The results are discussed in line with current literature.

Key Words: eating disorder, shame, compulsive exercise

1.Introduction

1.1 Eating Disorders in the Literature

Eating Disorders (ED) are a chronic mental health problem associated with high co-morbidity, negative physical and psychological outcomes and high mortality rates (Arcelus, Mitchell, Wales & Nielsen, 2011; Field *et al*. 2012). Current annual incidence rates in the UK are reported to be approximately 36.8 per 100,000 (Micali, Hagberg, Petersen & Treasure, 2013), with 90% of those female (Royal College of Psychiatrists', 2012). Given the relatively small prevalence rate, a significant proportion of ED literature makes use of non-clinical populations, or populations with self-reported difficulties. Studies that exclusively look at clinical ED populations are therefore hugely valuable in terms of adding to the evidence base and exploring clinical utility.

1.2 Compulsive Exercise and Eating Disorders

Elevated activity levels are a common feature among individuals with an ED (Beumont, Arthur, Russell & Touyz, 1994) and are associated with a lower minimum body mass index (BMI), earlier age of onset, greater levels of anxiety, perfectionism, obsessive-compulsive disorder, and greater ED symptomatology (Shroff *et al*. 2006). With regards to recovery, increased exercise levels have also been linked to poorer prognosis at two years (Rigaud, Pennacchio, Bizeul, Reveillard & Vergès, 2011), increased risk of relapse (Carter, Blackmore, Sutandar-Pinnock & Woodside, 2004), treatment dropout (ElGhoch *et al*. 2013) and longer hospitalisation (Solenberger, 2001).

A limitation within the field however is the extensive and varied use of terminology. 'Excessive exercise', 'exercise addiction', and 'compulsive exercise' (CE) have all been used; with one review citing thirty-one different terms describing unhealthy exercise in EDs (Adkins & Keel, 2005). The interchangeable use of terms, both between and within papers, is problematic not only for comparing across studies, but also as some do not provide operational definitions. Among the terms used, Adkins & Keel (2005) found two major themes; one describing the quantity of exercise undertaken, and the other an intrinsic need to exercise. Both perspectives appear consistent with qualitative reports from individuals with an ED (Sternheim, Dannar, Adan & VanElburg, 2015), however current evidence supports the idea that it is a pathological compulsion to exercise that is a predictor of ED

symptomatology, rather than the frequency or duration of time spent exercising (Adkins & Keel, 2005; Boyd, Abraham, & Luscombe, 2007).

Compulsivity, in a clinical context, refers to "an insistent urge to perform a behaviour to relieve the anxiety stemming from fear of perceived negative consequences if the behaviour is not performed" (Meyer, Taranis, Goodwin & Haycraft, 2011,p.181). Within ED populations, an insistent urge to exercise, despite in some cases severe emaciation, has long been recorded as a prominent characteristic (Meyer *et al*. 2011). For instance, in a cross-sectional study, DalleGrave, Calugi & Marchesini, (2008) found 46% of ED inpatients engaged in CE (n=165); with this being most prominent in those with AN-restricting subtype (80%).

1.3 Functions of Compulsive Exercise

While the presence of CE is gaining greater awareness, the role it plays within EDs remains less clear. In a systematic review, Meyer *et al*. (2011) identified four key correlates predictive of CE; eating psychopathology, obsessive-compulsiveness, affect regulation and perfectionism/rigidity. With regards to affect regulation, a specific role for CE was proposed. Authors suggested that CE has the ability to modulate affective states through both positive and negative reinforcement; i.e. seeking-out positive emotions that accompany exercise while also exercising as a means of managing negative emotions. Qualitative reports from individuals with Anorexia-Nervosa (AN) further endorse this hypothesis, reporting the management of negative emotions as a primary motivating factor for engagement in exercise (Long, Smith, Midgley & Cassidy, 1993).

Additional roles suggested of CE relate more to the physical aspects of EDs. For instance, CE can serve a direct function in calorific purgation (DalleGrave, 2008). It has also been reported that as body weight decreases, compulsivity increases naturally, with the result that individuals with severe EDs often feel compelled to be physically active despite suffering negative consequences (Meyer *et al*. 2011).

1.4 Relationship between Compulsive Exercise and Shame

While the link between CE and affect regulation has been acknowledged, studies have largely focused on the relationship between CE and emotional states such as depression and anxiety (see Meyer *et al.* 2011). Shame is another emotion highly prevalent within ED

populations (Goss & Allan, 2009), however its relationship with CE is far less researched. Shame can be described as a 'self-conscious emotion', arising in response to negative self-reflection and a feeling of inadequacy or failure (Burney & Irwin, 2000). Within ED populations, there has been considerable evidence to suggest a positive relationship between eating pathology and the tendency to experience shame (for a review, see Goss & Allan, 2009). In addition, the concept of shame has been further delineated to include measures of internal, external and bodily shame; each showing unique associations with ED symptomatology (see appendix H for operational definitions). For instance, external shame has been found to be associated with symptoms of AN while internal shame is associated with symptoms of Bulimia-Nervosa (BN) (Troop, Allan, Serpell, & Treasure, 2008). With regards to bodily shame, it has also been shown to be predictive of eating pathology both in clinical and non-clinical populations (Burney & Irwin, 2000; Doran & Lewis, 2012). In particular, current bodily shame was found to significantly predict binge eating, while anticipated bodily shame was a stronger predictor of weight gain avoidance (Troop, Sotrilli, Serpell & Treasure, 2006).

Given the high prevalence of shame and its detrimental effects on wellbeing, it would be useful to explore whether CE is also involved in the regulation of shame. To date, two studies have looked at the relationship between CE and shame. Troop *et al*. (2006) found that measures of current bodily shame significantly predicted excessive exercise in women with and without a history of an ED, while anticipated bodily shame significantly predicted excessive exercise in a non-clinical sample. Meyer, Blissett, Alberry & Sykes (2013) found that individuals with higher levels of ED attitudes were more likely to engage in exercise as a means of preventing negative social consequences, and that this belief was predicted by higher levels of defectiveness and shame. It was concluded that individuals with high levels of shame may therefore develop unhealthy exercise habits as a means of protecting themselves against perceived negative social comparisons. While both findings are useful as a preliminary examination of the link between exercise and shame, there are a number of methodological limitations. First, Meyer *et al*. (2013) examined maladaptive exercise beliefs, while Troop *et al*. (2006) explored excessive exercise. Neither study examined CE, which evidence supports as the most robust means of assessing pathological exercise in ED populations. Second, the study by Meyer *et al*. (2013) used a convenience sample of young female exercisers, while Troop *et al*. (2006) used a combination of non-clinical individuals

and those with a self-reported history of ED. With these limitations in mind, further exploration using a valid measure of CE and with clinical populations is imperative.

1.5 Present Study

The present study sought to build on the above research by examining the relationship between CE and shame. In addition, the study aimed to address the aforementioned limitations; specifically by using a validated measure of CE and making use of a clinical population of ED patients. Given the unique contribution of internal, external and bodily shame, each of these measures was also used to represent shame, and their relationship with CE explored. Given that previous research has suggested a role for CE in affect relation, and significant relationships have been found between CE and both depression and anxiety (see Meyer *et al*., 2011); the current study hypothesised that there would also be a significant relationship between CE and the different measures of shame.

2. Materials and Methods

As EDs are a relatively small clinical population it was necessary to recruit across multiple sites. Eleven health boards were initially approached (appendix I) and from this four agreed to support recruitment- NHS Lanarkshire, NHS Greater Glasgow and Clyde, NHS Fife, and NHS Coventry and Warwickshire. Ethical approval was obtained from the West of Scotland Ethics Committee, and management approval from each of the participating health boards (see appendix J-P). Following both ethical and management approval however, the ED team in NHS Coventry and Warwickshire failed to engage and therefore no participants were recruited from that site.

2.1 Participants

Participants were recruited from the Tier 3 Eating Disorders Specialist Service (TESS) and Psychological Therapies Teams (PTT) in Lanarkshire, the Adult Eating Disorder Service (AEDS) in Glasgow and the Anorexia Nervosa Intensive Treatment Team (ANITT) in Fife. Participants met the following inclusion criteria: (i) aged 16 or over, (ii) open to mental health services for treatment of an active ED, (iii) have an ED diagnosis in line with DSM-V criteria (appendix Q). Exclusion criteria were (i) individuals with significant clinical risk- as determined by their lead clinician; (ii) individuals being assessed for a possible ED, (iii) individuals deemed to be in recovery- again determined by their lead clinician.

The study used a cross-sectional design with the aim of exploring the relationship between CE and shame. Given the correlational nature, a sample size calculation for a correlation of 0.5 with 80% power suggested a required sample size of 29 (for calculation see appendix R).

2.2 Recruitment Procedures

Recruitment was between February and July 2016. The researcher met with all services to explain the nature of the study and clinicians were given the opportunity to ask questions. Clinicians at each site were responsible for assessing their case load in line with the inclusion and exclusion criteria and identifying eligible individuals. Eligible individuals were then provided with a recruitment pack; either during clinic appointments or mailed out by the service (dependent on clinician discretion). Recruitment packs consisted of an information sheet, researcher contact details and a web-link to the online questionnaire

(appendix S&T). Individuals were also given the option of requesting paper questionnaires if preferred. Each participant was provided with a unique identification number so as to allow confirmation of diagnosis following completion of the study. Consent was provided either electronically or in writing (appendix U), and participants were able to provide contact details should they wish to receive information regarding the outcome of the study.

An online survey was chosen due to evidence suggesting that this method is time and cost effective, flexible, acceptable to the general population, and promotes ease of data entry (Granello & Wheaton, 2004). Research has also suggested that online surveys may produce increased initial response rates compared to postal questionnaires (Ritter, Lorig, Laurent, & Matthews, 2004).

2.3 Measures

Each participant was provided with six questionnaires in the following order. It was suggested that the study would take approximately 20-30 minutes to complete.

- A *demographic questionnaire* included 10 questions relating to age, gender, occupation, ethnicity, ED diagnosis and exercise habits. For example 'How old were you when you were first diagnosed with an eating disorder?; On average how many exercise sessions do you do in a week? Response formats were a combination of free text and multiple-choice (appendix V).
- *The Compulsive Exercise Test* (CET; Taranis *et al*. 2011) is a 24-item questionnaire assessing the core clinical features of CE. Questions are rated on a 6-point Likert scale (0="never true", 5="always true"). Mean scores are calculated to represent the five subscale scores and the sum of this used to represent global CET score. Subscales include: Avoidance and rule driven behaviour (exercise despite illness/injury, experience of guilt when unable to exercise); Weight control (exercise for weight and shape reasons or as compensatory behaviour); Mood Improvement (positive and negative reinforcement of exercise); Exercise rigidity (strict and repetitive exercise routine); Lack of exercise enjoyment (exercise as a chore, finding no enjoyment in it). Higher scores predict greater pathology. Previous studies have reported good internal reliability with alpha levels ranging from α=.72-.88, plus good concurrent and convergent validity (Taranis *et al*. 2011) (appendix W).

- *Other as Shamer Scale* (OASS) (Goss, Gilbert, & Allan, 1994) is an 18-item questionnaire that measures self-evaluation in relation to how others perceive oneself (e.g. "other people put me down a lot", "other people look for my faults"). This scale represents a measure of external shame. Items are rated on a 5-point Likert scale (0="never", 4="almost always") with total scores ranging from 0-72; higher scores denote higher shame levels. Previous studies using individuals with a history of an ED have found internal reliability levels of α=.96 (Troop & Redshaw, 2012) and α=.93 (Troop *et al*. 2008) (appendix X).
- *Test of Self-Conscious Affect-Version 3* (TOSCA-3) (Tangney, Dearing, Wagner & Gramzow, 2000) is an 11-item questionnaire examining shame-proneness, guilt-proneness and externalisation of blame. The questionnaire is scenario-based and participants are asked to record how they would react to everyday situations. Using a 5-point Likert scale (1="not likely", 5="very likely"), participants rate the likelihood they would engage in a series of behavioural responses for each scenario. The sum of responses is then calculated to gain a total score ranging from 11-55. For the purpose of this study only the shame subscale was used to represent a measure of internal shame. Higher scores depicted higher levels of shame-proneness. In a validation study using a clinical population, an internal reliability score of α=.91 was found (Rusch *et al*. 2007) (appendix Y).
- *Bodily Shame Scale* (BSS) (Troop *et al*. 2006) is an 8-item questionnaire that measures clinical features associated with shame relating to the body. It considers both current and anticipated shame, and provides scores for each. Items are rated on a 5-point Likert scale (0="strongly disagree", 4="strongly agree"), with higher scores indicating higher levels of bodily shame. Previous studies have found internal reliability levels for the anticipated and current shame subscales to be α=0.87, 0.78 (Troop & Redshaw, 2012) and α=.76, .88 (Troop *et al*. 2006) in individuals with a history of an ED (appendix Z).
- *The Hospital Anxiety and Depression Scale* (HADS) (Zigmond & Snaith, 1983) is a 14-item questionnaire assessing clinical features of anxiety and depression. A review of the validity of the HADS was conducted by Bjelland, Dahl, Haug & Neckelmann (2002) and internal reliability levels of α=.68-.93 for the anxiety subscale, and α=.67-.90 for the depression subscale were found (appendix AA).

2.4 Data Analysis

Data were analysed using SPSS v21. Initially, the suitability of the data for correlation and regression analysis was examined. The assumptions of normality, linearity, and homoscedasticity were assessed through examination of Q-Q plots and scatter plots. Results showed that not all variables met these assumptions and therefore non-parametric testing was adopted. In respect to regression analysis, examination of P-P plots and residual scatter plots confirmed that all model assumptions were met; residuals were independent, normally distributed and had constant variance.

The study's primary aim was to explore the relationship between CE and shame. As such, a series of Spearman's Rank correlations were conducted for all study variables. Linear regression analyses were also performed for all significant relationships involving CE in order to explore the nature of these further. Given that CE was the primary variable of study; for all regression analyses CET score was entered as the dependent variable and shame measures as independent predictor variables. Finally, given that both anxiety and depression are both highly prevalent within EDs (Bulik, 2002), and both have been shown to be related to measures of shame (Gilbert, 2000), subsequent step-wise regression analyses were also performed on significant findings to control for these variables. It should be noted that for both correlation and regression analyses participants across diagnostic groups were combined due to the relatively small sample size.

In addition to the primary aim, descriptive statistics of the sample population and outcome measures were also recorded. A series of Mann-Whitney U-tests were conducted to determine whether individuals with AN and BN differed with regards to outcome variables.

3. Results

3.1 Sample Demographics

Twenty-one individuals were recruited over six months: nine from TESS (43%), one from PTT (5%), eight from AEDS (38%) and three from ANITT (14%). A total of 76 individuals were initially approached, giving a response rate of 27.6%. One individual completed only the demographic information and was therefore not included in analysis. Three further participants had incomplete data- each missing one response from the CET. Current research provides no guidance on how to manage missing data and therefore the researcher contacted the measures' authors to seek further guidance. Unfortunately there was no response from this and therefore, through discussion with the research team, it was decided that missing data would be replaced by average scores for each subscale. The total number of participants involved in analysis was therefore twenty.

The sample mean age was 31.7 years (SD=10.98). Only one participant was male and all were British Caucasian. Eight reported being employed full time (40%), two part-time (10%), six unemployed (30%) and four students (20%). Thirteen had a diagnosis of AN (65%), six a diagnosis of BN (30%) and one had a diagnosis of Other-Specified Feeding or Eating Disorder (OSFED) (5%). The average age of diagnosis was 25.5 years (SD=11.4) and the length of time individuals had received treatment varied between 1 month and 15 years. With regards to exercise, the median number of times participants engaged in exercise each week was between 5-6, with each session lasting approximately 30-60 minutes. Three participants felt their exercise was a problem (15%), sixteen did not feel it was a problem (80%) and one was unsure (5%). Median and inter-quartile values for measures are presented in *table 1*.

3.2 Correlations

Results from Spearman's Rank Correlations are presented in *table 1* and associated scatter plots in *figure 1*. Results show only internal shame (TOSCA) was significantly associated with CE ($r=.496$, $p<.05$); suggesting that individuals with greater levels of internal shame likely present with higher levels of CE.

Table 1: *Spearman's Rank Correlations between study variables (n=20)*

	Median & Inter-quartile range	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. CET- global	14.74 (10.9-16.1)	*1*						
2. OAS	39 (30.5-51.5)	-.065	*1*					
3. TOSCA-shame	46 (41.5-51)	.496*	.505*	*1*				
4. BSS-anticipated	3.5 (2.9-4)	.192	403	.279	*1*			
5. BSS-current	3.3 (2.8-3.8)	.007	.614**	.369	.514*	*1*		
6. HADS-Anxiety	14 (11.8-15)	.058	.370	.076	-.080	.120	*1*	
7. HADS-Depression	9 (7-10.2)	.051	.494*	.266	.289	.322	.355	*1*

**p<.05; **p<.01*

Note: CET- Compulsive Exercise Test; OAS- Other As Shamer Scale; TOSCA- Test of Self-Conscious Affect' BSS- Bodily Shame Scale; HADS-Hospital Anxiety and Depression Scale

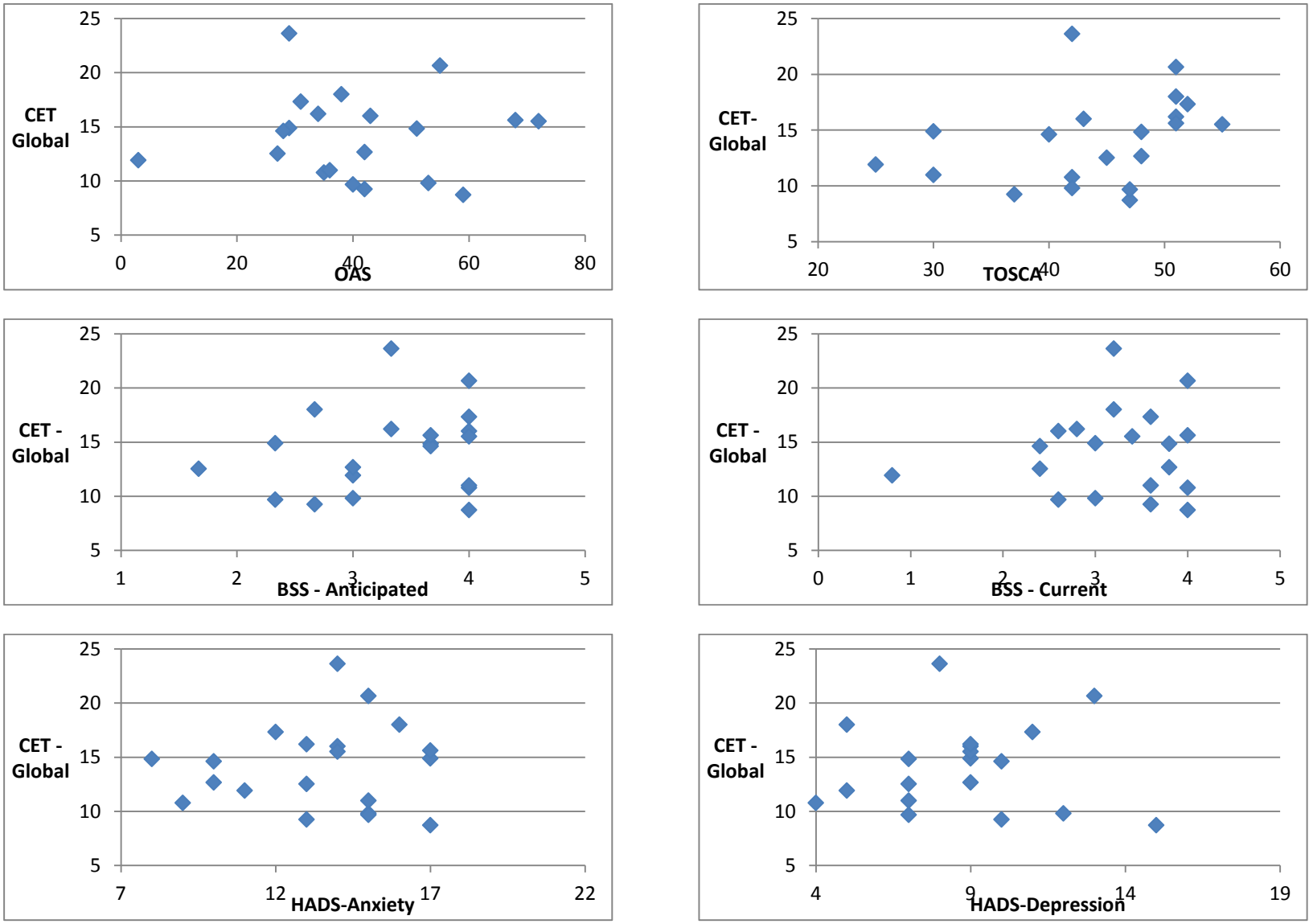
Table 2*: Spearman's Rank Correlations between CET subscales and study variables (n=20)*

	OAS	**TOSCA-shame**	**BSS-anticipated**	**BSS-current**	**HADS-Anxiety**	**HADS-Depression**
Avoidance and Rule Driven Behaviour	.066	.495*	.287	.107	.211	.168
Weight Control	-.042	.214	.367	.195	.154	.063
Mood Improvement	-.207	.037	.286	-.084	-.148	-.075
Lack of Enjoyment	.044	.334	-.094	.039	-.158	-.147
Exercise Rigidity	-.236	.425	-.079	-.192	.067	.200

**p<.05*

Note: CET- Compulsive Exercise Test; OAS- Other As Shamer Scale; TOSCA- Test of Self-Conscious Affect' BSS- Bodily Shame Scale; HADS-Hospital Anxiety and Depression Scale

Figure 1: *Scatter plots depicting the relationship between CE, shame and mood*



Note: CET- Compulsive Exercise Test; OAS- Other As Shamer Scale; TOSCA- Test of Self-Conscious Affect; BSS- Bodily Shame Scale; HADS-Hospital Anxiety and Depression Scale

When looking at the individual subscales of compulsive exercise, it was found that internal shame was significantly associated with the avoidance and rule-driven behaviour scale ($r=.496$, $p<.05$), but not with weight control, mood improvement, lack of exercise enjoyment or exercise rigidity scales (*table 2*).

Significant associations were also found between the different measures of shame. A significant and positive relationship was found between internal and external shame ($r=.505$, $p<.05$), and between external shame and current bodily shame ($r=.614$, $p<.01$). Current bodily shame was also significantly associated with anticipated bodily shame ($r=.514$, $p<.05$). Finally, depression was significantly and positively associated with external shame ($r=.494$, $p<.05$).

3.3 Regression

Regression analysis was conducted to further explore the relationship between CE and internal shame. Results showed that internal shame did not significantly predict level of CE ($F(1,18)=2.34$, $p=.1.4$). As this relationship was not significant there was no need for further analysis to control for depression and anxiety.

3.4 Comparison between Diagnostic Groups

When comparing the study variables between individuals with AN and BN, results from a series of Mann-Whitney U-tests found there to be no significant difference between the two groups (appendix BB).

4. Discussion

4.1 Relationship between Compulsive Exercise and Shame

Results from this exploratory study indicate a positive relationship between CE and internal shame. This suggests that, for those with an ED, individuals with higher CE may be more likely to experience higher levels of internal shame. This finding is beneficial for hypothesising about the role of CE within the wider ED context, in particular thinking about possible motivations for, or maintenance factors of, CE. Given the correlational nature of the study, it should be noted that all hypotheses provided are speculative. Nonetheless they are a useful addition to the literature.

First, given that previous research suggests a possible role for CE in affect regulation (Meyer *et al*. 2011); it is possible that the positive relationship between CE and internal shame may also relate to this process. In particular, a provisional hypothesis from the current findings may be that CE serves a role in the regulation of internal shame. Such a hypothesis can be seen to integrate well with current literature. In Fairburn *et al*.'s (2003) transdiagnostic model of EDs, individuals with mood intolerance engage in "dysfunctional mood modulatory behaviours" as a means of coping with certain emotional states (p.517). Fairburn and colleagues suggest that exercise may function as such a behaviour and, over time, that this may become a habitual method of affect regulation. In support of this, subsequent research has suggested a role for CE in the regulation of negative affective states such as depression and anxiety (Meyer *et al*. 2011). Shame is an additional negative emotion highly prevalent in EDs (Goss & Allan, 2009) and therefore it may be clinically reasonable to assume that individuals also engage in CE as a means of managing their feelings of shame. This hypothesis would explain the significant relationship between CE and internal shame, by supposing that individuals with high levels of internal shame engage in high levels of CE as a way of managing this.

It is interesting to note that no significant relationship was found between internal shame and the CET mood improvement subscale. This finding suggests individuals who engage in exercise as a means of affect regulation are not more likely to experience internal shame. Had results been in line with the affect regulation hypothesis of CE, one might have expected a significant relationship between the two variables. Specifically, a positive relationship may have suggested that for those with higher levels of internal shame, there is

more of a drive to engage in pathological exercise as a means of managing such. It is interesting to note however that there was also no significant relationship between the mood improvement subscale and either depression or anxiety. Given that previous research has suggested a role for CE in the regulation of both of these affective states (Meyer *et al*. 2011), the current results may therefore need replicating in order to assess their validity. In particular, a possible limitation may have been that in the current sample 80% scored within clinical range for anxiety (the rest scoring in the borderline range), but only 20% scored within clinical range for depression (45% borderline, 35% normal). As such, scores may not be diverse enough to detect a significant relationship.

A second hypothesis derived from the results is that CE may arise as a consequence of high levels of internal shame. In a study of females with a history of an ED, Troop, Allan, Serpell & Treasure (2008) found internal shame to be a significant predictor of BN symptom severity; in particular an over-concern with body weight and shape. As individuals with higher levels of internal shame likely have greater concerns regarding their weight and shape, they may therefore engage in higher levels of CE as a means of managing, or attempting to modify, this pathology. This hypothesis appears consistent with evidence supporting the role of CE as a compensatory behaviour (DalleGrave, 2008) and may therefore be helpful in explaining the positive association found between CE and internal shame. As above however, it is interesting to note that the weight control subscale of the CET was not significantly associated with level of internal shame. In line with this hypothesis, one may have expected a significant relationship between these two variables. Further research using larger clinical samples would be beneficial.

A final hypothesis, in opposition to the one above, is that internal shame may arise as a consequence of high levels of CE. Results from a qualitative study investigating the role of CE in AN found that a number of individuals regarded their exercise as shameful (Clarke, 2013). In this instance, CE may therefore arise as a by-product of ED pathology, and internal shame levels increase as a result of individuals regarding this behaviour as shameful or wrong. While evidence supportive of this hypothesis is limited at present, it may be an area worth exploring in future studies.

While the above hypotheses relate to the finding that CE is positively related to internal shame, current literature may also have predicted a positive relationship between CE

and other measures of shame. In a study of female exercisers, Meyer *et al*. (2013) found that individuals with higher levels of ED attitudes were more likely to engage in exercise as a means of reducing negative social comparisons, and that this belief was predicted by higher levels of defectiveness and shame. Given that shame may drive individuals to exercise as a means of preventing negative social outcomes, it may therefore have been viable to assume that external shame would be related to CE. Similarly, results from Troop *et al*. (2006) found that, among women with a history of an ED, current bodily shame significantly predicted excessive exercise. Again one may have been justified in assuming that there may also have been a significant relationship between CE and current bodily shame. One suggestion why neither relationship was found in the present study may relate to specific differences within the measures of exercise. Meyer *et al*. (2013) examined maladaptive exercise beliefs, Troop *et al*. (2006) excessive exercise, while the present study assessed CE. Given the evidence supporting CE as the most robust measure of pathological exercise, further research assessing this construct within larger clinical samples would therefore be helpful in exploring these relationships further.

4.2 Prevalence of Shame and Compulsive Exercise within Sample Population

At present the CET is the only validated measure of CE, while the TOSCA, OAS and BSS are some of only a few clinically robust measures of shame. A limitation with these is that normative and clinical cut-off scores have not yet been developed. This means it is not possible to determine whether the study population differed significantly, or clinically, from the general population. (See appendix CC for a comparison of current and past results). Additional work to develop meaningful psychometric properties for each of the measures would therefore aid subsequent research and make findings more clinically meaningful.

4.3 Limitations

When interpreting the above results it is important to be mindful of a number of study limitations. Most notably perhaps, the relatively small sample size. One consequence of having an underpowered study is a reduced chance of detecting a true effect (Maxwell, 2004). Therefore, while the current results suggest internal shame to be significantly associated with CE, it is not possible to draw conclusive findings. Similarly, the result that no additional measure of shame is significantly associated with CE is also not irrefutable. Further studies using larger clinical samples are therefore imperative. In addition, given the small sample size it was not possible to explore the relationship between CE and shame among individual

diagnostic groups. Given that past research has shown different facets of shame to be associated with different ED symptoms (Troop *et al*. 2008), it would be useful for future studies to examine these individual relationships further.

There were a number of difficulties that may have led to the small sample size. First, recruitment of ED populations can be difficult. In this study, a possible explanation may relate to the studies design. The current study used an online format with the hope that this would ease recruitment over multiple sites and increase response rate. It may however be worthwhile future research examining the appropriateness of this for ED populations. A second difficulty was that the number of individuals approached to participate in the study was lower than expected. In particular, the ED service in Coventry and Warwickshire did not contribute to recruitment. This was a significant setback considering the population served by the health board is significant. It is possible that the distance between this service and the researcher may have been a barrier. Given the distance it was not possible to attend the service to explain the study personally and instead all communication was via email or phone. This lack of face-to-face contact likely impacted on service engagement.

Due to the nature of recruitment, a second limitation is that the results are susceptible to selection bias. It is unclear whether individuals that opted to participate in the study varied significantly on levels of shame, exercise or mood, compared to those that declined. Similarly, as the exclusion criteria relied heavily on individual clinician judgment, there may have been bias in terms of who was provided with a recruitment pack. The study did not assess or control for ED severity, and it is possible that with regards to the exclusion criteria, individuals with more severe EDs were not approached. ED severity is known to be associated with higher levels of shame (Goss & Allan, 2009) and, while research should never override sound and considered clinical judgment, it would be important for future studies to control for this. In addition, findings were also reliant on self-report measures, and responses may not therefore have been accurate or representative of individuals' true feelings and behaviours.

A third limitation is the risk of order effect bias. Given that all individuals were asked about exercise first, it is possible that those that did not feel exercise was important or relevant to them may not have engaged. This is a possibility for the participant who provided only demographic information. Response to the demographic questions stated that the

individual did not do any exercise. It is possible that presenting the measures in the same order, with CET first, influenced participation in the study by biasing engagement to those that were actively involved in exercise. Future studies should look to address this limitation in order to capture a more robust and accurate view of the relationship between shame and compulsive exercise.

A fourth limitation was the largely homogenous sample population. The sample consisted of 95% females and 100% British Caucasian individuals. While this is likely representative of clinical populations seen in ED services across Scotland, caution needs to be taken when comparing these results more broadly, as the uniformity of the present sample puts constraints on the generalisation of findings.

Another possible limitation was that no measure of eating disorder pathology/severity or BMI was used in this study. Previous research has suggested that the presence of unhelpful exercise is associated with a lower minimum BMI (Shroff et al. 2006) and is most frequently reported in individuals with AN (DalleGrave et al. 2008). In their study of 165 ED inpatients, DalleGrave et al. (2008) found that CE was present in 80% of individuals with restrictive-AN, 43.3% in binge-purge-AN, 39.3% in BN and 31.9% in EDNOS. Given that CE is associated with a lower BMI and symptoms typical of AN, it would be interesting for future studies to assess whether these constructs also impact on the relationship between CE and shame. The present study did not use a measure of ED severity as it was an exploratory study looking only at the relationship between CE and shame within individuals diagnosed with an ED. For this purpose it was felt that a clinical diagnosis provided by the participant's clinician would suffice. The study had aimed to examine the relationship between CE and shame between diagnostic groups, however due to the small sample size this was not possible. Future studies may wish to explore this avenue and include either a measure of ED pathology, or make use of BMI data which is often routinely collected by services.

Finally, due to the cross-sectional design of the study it was not possible to examine the temporal nature of the relationship. Previous research has suggested that improvements in CE over time are associated with better outcomes; specifically lower ED pathology and a higher BMI (DalleGrave et al. 2008; Danielsen, Rø, Romild & Bjørnelv, 2016). Similarly, research has suggested that improvements in shame are also associated with a reduction in ED pathology (Kelly, Carter & Borairi, 2014). Given this pattern it may be interesting for

future research to examine the temporal nature of the relationship between CE and shame and assess whether changes in one are associated with changes in the other. Further research is therefore required to expand on the present findings. Specifically, longitudinal or cohort studies would be important to examine the relationship between CE and shame over time, allowing for inferences to be drawn regarding the possible temporal course of the association. In addition qualitative studies, such as Clarke et al. (2013), may also provide richer detail regarding the proposed hypotheses and would therefore be a useful addition to the literature.

4.4 Practical Applications

Within a clinical context, results suggest that it may be important to take into account the relationship between CE and shame when formulating a patient's difficulties. Understanding the driving factors behind CE, rather than focusing on the overt behaviours, will likely lead to greater treatment success. Individuals who engage in CE may be driven to do so by a need to suppress or compensate for high levels of internal shame, or as a practical means of weight control and alleviation of fear. Understanding the mechanisms maintaining CE would therefore be an important element in developing an effective intervention. In addition, the study's findings would provide support for novel interventions that specifically address levels of shame, e.g. Compassion Focused Therapy (Gilbert, 2012). Given the possible relationship between CE and shame, such therapies may also be beneficial for those who engage in CE.

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Appendix A- Author Guidelines

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Author Guidelines

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Illustrations must be submitted in electronic format. Save each figure as a separate file, in **TIFF** or **EPS** format preferably, and include the source file. We favour dedicated illustration packages over tools such as Excel or Powerpoint. Grey shading (tints) are not acceptable. Lettering must be of a reasonable size that would still be clearly legible upon reduction, and consistent within each figure and set of figures. Supply artwork at the intended size for printing. The artwork must be sized to the text width of 7 cm (single column) or 15 cm (double column).

Manuscript style. All submissions, including book reviews, should be double-spaced and clearly legible.

The first page should contain the **title** of the paper, full names of all authors, the address where the work was carried out, and the full postal address including telephone, fax number and email to whom correspondence and proofs should be sent. The name(s) of any **sponsor(s)** of the research contained in the paper, along with **grant number(s)** should also be included.

The second sheet should contain an **abstract** of up to 150 words. An abstract is a concise summary of the whole paper, not just the conclusions, and is understandable without reference to the rest of the paper. It should contain no citation to other published work. Include up to five **keywords** that describe your paper for indexing purposes.

- **Research articles** reporting new research of relevance as set out in the aims and scope should not normally exceed 6000 words with no more than five tables or illustrations.

They should conform to the conventional layout: title page, summary, introduction, materials and methods, results, discussion, acknowledgements and references. Each of these elements should start on a new page. Authors may not find it necessary to use all of these subdivisions, and they are listed here only as a guide.

- **Review articles** should offer a synthesis of current knowledge in a field where rapid or significant progress has been made. The text should ideally not exceed 7000 words, 50 references and 5 figures or tables.
- **Brief reports** should concisely present the essential findings of the author's work and be compromised of the following sections: Abstract, Introduction and Aims, Method, Results, Discussion, and References. Tables and/or figures should be kept to a minimum, in number and size, and only deal with key findings. In some cases authors may be asked to prepare a version of the manuscript with extra material to be included in the online version of the review (as supplementary files). Submissions in this category should not normally exceed 2500 words in length.
  Brief reports bring with them a whole host of benefits including: quick and easy submission, administration centralised and reduced and significant decrease in peer review times, first publication priority (this type of manuscript will be published in the next available issue of the journal).
- **Case Reports** The journal does not accept case reports for publication. Authors of case reports are encouraged to submit to the Wiley Open Access journal, Clinical Case Reports www.clinicalcasesjournal.com which aims to directly improve health outcomes by identifying and disseminating examples of best clinical practice.

Reference style . The APA system of citing sources indicates the author's last name and the date, in parentheses, within the text of the paper.

A. A typical citation of an entire work consists of the author's name and the year of publication .

Example: Charlotte and Emily Bronte were polar opposites, not only in their personalities but in their sources of inspiration for writing (Taylor, 1990). Use the last name only in both first and subsequent citations, except when there is more than one author with the same last name. In that case, use the last name and the first initial.

B. If the author is named in the text, only the year is cited .

Example: According to Irene Taylor (1990), the personalities of Charlotte. . .

C. If both the name of the author and the date are used in the text, parenthetical reference is not necessary .

Example: In a 1989 article, Gould explains Darwin's most successful. . .

D. Specific citations of pages or chapters follow the year .

Example: Emily Bronte "expressed increasing hostility for the world of human relationships, whether sexual or social" (Taylor, 1988, p. 11).

E. When the reference is to a work by two authors, cite both names each time the reference appears .

Example: Sexual-selection theory often has been used to explore patters of various insect matings (Alcock & Thornhill, 1983) . . . Alcock and Thornhill (1983) also demonstrate. . .

F. When the reference is to a work by three to five authors, cite all the authors the first time the reference appears. In a subsequent reference, use the first author's last name followed by *et al* . (meaning "and others") .

Example: Patterns of byzantine intrigue have long plagued the internal politics of community college administration in Texas (Douglas *et al* ., 1997) When the reference is to a work by six or more authors, use only the first author's name followed by *et al* . in the first and all subsequent references. The only exceptions to this rule are when some confusion might result because of similar names or the same author being cited. In that case, cite enough authors so that the distinction is clear.

G. When the reference is to a work by a corporate author, use the name of the organization as the author .

Example: Retired officers retain access to all of the university's educational and recreational facilities (Columbia University, 1987, p. 54).

H. Personal letters, telephone calls, and other material that cannot be retrieved are not listed in References but are cited in the text .

Example: Jesse Moore (telephone conversation, April 17, 1989) confirmed that the ideas. . .

I. Parenthetical references may mention more than one work, particularly when ideas have been summarized after drawing from several sources. Multiple citations should be arranged as follows .

Examples:

- List two or more works by the same author in order of the date of publication: (Gould, 1987, 1989)
- Differentiate works by the same author and with the same publication date by adding an identifying letter to each date: (Bloom, 1987a, 1987b)
- List works by different authors in alphabetical order by last name, and use semicolons to separate the references: (Gould, 1989; Smith, 1983; Tutwiler, 1989).

All references must be complete and accurate. Where possible the DOI for the reference should be included at the end of the reference. Online citations should include date of access. If necessary, cite unpublished or personal work in the text but do not include it in the reference list. References should be listed in the following style:

Journal Article

Gardikiotis, A., Martin, R., & Hewstone, M. (2004). The representation of majorities and minorities in the British press: A content analytic approach. *European Journal of Social Psychology, 34* , 637-646. DOI: 10.1002/ejsp.221

Book

Paloutzian, R. F. (1996). *Invitation to the psychology of religion* (2nd ed.). Boston: Allyn and Bacon.

Book with More than One Author

Natarajan, R., & Chaturvedi, R. (1983). *Geology of the Indian Ocean* . Hartford, CT: University of Hartford Press.
Hesen, J., Carpenter, K., Moriber, H., & Milsop, A. (1983). *Computers in the business world* . Hartford, CT: Capital Press. and so on.
The abbreviation *et al.* is not used in the reference list, regardless of the number of authors, although it can be used in the text citation of material with three to five authors (after the inital citation, when all are listed) and in all parenthetical citations of material with six or more authors.

Web Document on University Program or Department Web Site

Degelman, D., & Harris, M. L. (2000). *APA style essentials* . Retrieved May 18, 2000, from Vanguard University, Department of Psychology Website: http://www.vanguard.edu/faculty/ddegelman/index.cfm?doc_id=796

Stand-alone Web Document (no date)

Nielsen, M. E. (n.d.). *Notable people in psychology of religion* . Retrieved August 3, 2001, from http://www.psywww.com/psyrelig/psyrelpr.htm

Journal Article from Database

Hien, D., & Honeyman, T. (2000). A closer look at the drug abuse-maternal aggression link. *Journal of Interpersonal Violence, 15* , 503-522. Retrieved May 20, 2000, from ProQuest database.

Abstract from Secondary Database

Garrity, K., & Degelman, D. (1990). Effect of server introduction on restaurant tipping. *Journal of Applied Social Psychology, 20* , 168-172. Abstract retrieved July 23, 2001, from PsycINFO database.

Article or Chapter in an Edited Book

Shea, J. D. (1992). Religion and sexual adjustment. In J. F. Schumaker (Ed.), *Religion and mental health* (pp. 70-84). New York: Oxford University Press.

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Appendix B- Diagnoses included in literature search

The following diagnoses were included in the study based on diagnostic criteria for DSM-IV, DSM-V and ICD-10

DSM-IV

- Anorexia Nervosa
- Bulimia Nervosa
- Eating Disorder Not Otherwise Specified

DSM- V

- Anorexia Nervosa
- Bulimia Nervosa
- Other Specified Feeding or Eating Disorder
- Binge Eating Disorder

ICD-10

- Anorexia Nervosa
- Atypical Anorexia Nervosa
- Bulimia Nervosa
- Atypical Bulimia Nervosa

Appendix C- Selection of diagnostic constructs

The following shows how the included study variables were determined based on diagnostic criteria from DSM-IV, DSM-V and ICD-10.

DSM-V	DSM-IV	ICD-10
ANOREXIA-NERVOSA (AN)		
a. Persistent restriction of energy intake leading to significantly low body weight (in context of what is minimally expected for age, sex, developmental trajectory, and physical health).	a. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g. weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected).	a. Body weight is maintained at least 15% below that expected (either lost or never achieved), or Quetelet's body-mass index is 17.5 or less. Prepubertal patients may show failure to make the expected weight gain during the period of growth.
b. Either an intense fear of gaining weight or of becoming fat, or persistent behaviour that interferes with weight gain (even though significantly low weight).	b. Intense fear of gaining weight or becoming fat, even though underweight.	b. The weight loss is self-induced by avoidance of 'fattening foods'. One or more of the following may also be present: self-induced vomiting; self-induced purging; excessive exercise; use of appetite suppressants and/or diuretics.
c. Disturbance in the way one's body weight or shape is experienced, undue influence of body shape and weight on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.	c. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.	c. There is body-image distortion in the form of a specific psychopathology whereby a dread of fatness persists as an intrusive, overvalued idea and the patient imposes a low weight threshold on himself or herself.
	d. In postmenarcheal females, amenorrhoea, i.e. the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhoea if her periods occur only following hormone, e.g. oestrogen, administration.)	d. A widespread endocrine disorder involving the hypothalamic-pituitary-gonadal axis, manifest in the female as amenorrhoea, and in the male as a loss of sexual interest and potency (an apparent exception is the persistence of vaginal bleeds in anorexic women who are on replacement hormonal therapy, most commonly taken as a contraceptive pill).
		e. If onset is prepubertal, the sequence of pubertal events is delayed or even arrested
• *Variables related to AN diagnostic criteria: dietary restriction, eating concern, drive for thinness, fear of gaining weight, shape concern, weight concern, lack of insight*		
BULIMIA-NERVOSA (BN)		
a. Recurrent episodes of binge eating....Eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances.... A sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating).	a. Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following: (1) eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances; (2) a sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating).	a. There is a persistent preoccupation with eating, and an irresistible craving for food; the patient succumbs to episodes of overeating in which large amounts of food are consumed in short periods of time.

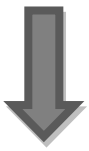
b. Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, or other medications, fasting, or excessive exercise.	b. Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting or excessive exercise.	b. The patient attempts to counteract the 'fattening' effects of food by one or more of the following: self-induced vomiting; purgative abuse, alternating periods of starvation; use of drugs such as appetite suppressants, thyroid preparations or diuretics. When bulimia occurs in diabetic patients they may choose to neglect their insulin treatment.
c. The binge eating and inappropriate compensatory behaviours both occur, on average, at least once a week for three months.	c. The binge eating and inappropriate compensatory behaviours both occur, on average, at least twice a week for 3 months.	c. The psychopathology consists of a morbid dread of fatness and the patient sets herself or himself a sharply defined weight threshold, well below the premorbid weight that constitutes the optimum or healthy weight in the opinion of the physician. There is often, but not always, a history of an earlier episode of anorexia nervosa, the interval between the two disorders ranging from a few months to several years. This earlier episode may have been fully expressed, or may have assumed a minor cryptic form with a moderate loss of weight and/or a transient phase of amenorrhoea.
d. Self-evaluation is unduly influenced by body shape and weight.	d. Self-evaluation is unduly influenced by body shape and weight.	
e. The disturbance does not occur exclusively during episodes of Anorexia Nervosa	e. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.	

- *Variables related to BN diagnostic criteria: binging, eating concern, purging, drive for thinness, fear of weight gain, shape concern, weight concern*

OTHER SPECIFED FEEDING OR EATING DISORDER (OSFED	**EATING DISORDER NOT OTHERWISE SPECIFIED (EDNOS)**	**ATYPICAL BULIMIA**
a. Atypical Anorexia Nervosa: All criteria are met, except despite significant weight loss, the individual's weight is within or above the normal range.	a. For females, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses.	Researchers studying atypical forms of bulimia nervosa, such as those involving normal or excessive body weight, are recommended to make their own decision about the number and type of criteria to be fulfilled
b. Binge Eating Disorder (of low frequency and/or limited duration)**:** All of the criteria for BED are met, except at a lower frequency and/or for less than three months.	b. All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.	**ATYPICAL ANOREXIA**
c. Bulimia Nervosa (of low frequency and/or limited duration): All of the criteria for Bulimia Nervosa are met, except that the binge eating and inappropriate compensatory behaviour occurs at a lower frequency and/or for less than three months.	c. All of the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for a duration of less than 3 months.	Researchers studying atypical forms of anorexia nervosa are recommended to make their own decision about the number and type of criteria to be fulfilled.

d. Purging Disorder: Recurrent purging behaviour to influence weight or shape in the absence of binge eating	d. The regular use of inappropriate compensatory behaviour by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of two cookies).	
BINGE-EATING DISORDER (BED)	e. Repeatedly chewing and spitting out, but not swallowing, large amounts of food.	
a. Recurrent episodes of binge eating. - Eating, in a discrete period of time an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances. - A sense of lack of control over eating during the episode	f. Binge-eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviours characteristic of Bulimia Nervosa (see Appendix B in DSM-IV-TR for suggested research criteria).	
b. Binge episodes are associated with three or more of the following: eating much more rapidly than normal; eating until feeling uncomfortably full; eating large amounts of food when not feeling physically hungry; eating alone because of feeling embarrassed by how much one is eating; feeling disgusted with oneself, depressed or very guilty afterward.		
c. Binge eating occurs, on average, at least once a week for three months and causes marked distress		
d. Binge eating not associated with the recurrent use of inappropriate compensatory behaviours		

- *Variables related to EDNOS, OSFED, Atypical AN, Atypical BN and BED diagnostic criteria: binging, eating concern, purging, drive for thinness, fear of weight gain, shape concern, weight concern, dietary restriction,*



Constructs Included in Review based on Diagnostic Criteria:

- *Dietary restriction*
- *Eating concern*
- *Drive for thinness*
- *Fear of gaining weight*
- *Shape concern*
- *Weight concern*
- *Binging*
- *Purging*

References:

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

National Collaborating Centre for Mental Health UK. (2004). *Eating disorders: Core interventions in the treatment and management of anorexia nervosa, bulimia nervosa and related eating disorders*. Appendix 17- Diagnostic Criteria for Eating Disorders. [accessed online 8.7.16] http://www.ncbi.nlm.nih.gov/books/NBK49317/

World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. [accessed online 8.7.16] http://www.who.int/classifications/icd/en/GRNBOOK.pdf

Appendix D- Search Strategy

1. ("eating disorder" OR anorexia OR bulimia OR "binge eating disorder" OR "eating disorder not otherwise specified" OR "other specified feeding or eating disorder" OR "body image" OR "body dissatisfaction")

2. ("self-compassion" OR compassion OR "compassionate mind" OR "compassion focused therapy")

3. 1 AND 2

Appendix E- Quality Appraisal Checklist for Quantitative Studies Reporting Correlations and Associations

Appendix G Quality appraisal checklist – quantitative studies reporting correlations and associations
NICE (2012) Methods for the development of NICE public health guidance (third edition). https://www.nice.org.uk/article/pmg4/resources/non-guidance-methods-for-the-development-of-nice-public-health-guidance-third-edition-pdf (p214-220)

A correlates review (see section 3.3.4) attempts to establish the factors that are associated or correlated with positive or negative health behaviours or outcomes. Evidence for correlate reviews will come both from specifically designed correlation studies and other study designs that also report on correlations.

This checklist[15] has been developed for assessing the validity of studies reporting correlations. It is based on the appraisal step of the 'Graphical appraisal tool for epidemiological studies (GATE)', developed by Jackson et al. (2006).

This checklist enables a reviewer to appraise a study's internal and external validity after addressing the following key aspects of study design: characteristics of study participants; definition of independent variables; outcomes assessed and methods of analyses.

Like GATE, this checklist is intended to be used in an electronic (Excel) format that will facilitate both the sharing and storage of data, and through linkage with other documents, the compilation of research reports. Much of the guidance to support the completion of the critical appraisal form that is reproduced below also appears in 'pop-up' windows in the electronic version[16].

There are 5 sections of the revised GATE. Section 1 seeks to assess the key population criteria for determining the study's **external validity** – that is, the extent to which the findings of a study are generalisable beyond the confines of the study to the study's source population.

Sections 2 to 4 assess the key criteria for determining the study's **internal validity** – that is, making sure that the study has been carried out carefully, and that the identified associations are valid and are not due to some other (often unidentified) factor.

Checklist items are worded so that 1 of 5 responses is possible:

++	Indicates that for that particular aspect of study design, the study has been designed or conducted in such a way as to minimise the risk of bias.
+	Indicates that either the answer to the checklist question is not clear from the way the study is reported, or that the study may not have addressed all potential sources of bias for that particular aspect of study design.
−	Should be reserved for those aspects of the study design in which significant sources of bias may persist.
Not reported (NR)	Should be reserved for those aspects in which the study under review fails to report how they have (or might have) been considered.

Not applicable (NA)	Should be reserved for those study design aspects that are not applicable given the study design under review (for example, allocation concealment would not be applicable for case–control studies).

In addition, the reviewer is requested to complete in detail the comments section of the quality appraisal form so that the grade awarded for each study aspect is as transparent as possible.

Each study is then awarded an overall study quality grading for internal validity (IV) and a separate one for external validity (EV):

- ++ All or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are very unlikely to alter.
- + Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter.
- - Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

Study identification: Include full citation details		
Study design: Refer to the glossary of study designs (appendix D) and the algorithm for classifying experimental and observational study designs (appendix E) to best describe the paper's underpinning study design		
Guidance topic:		
Assessed By:		
Section 1: Population	**Rating**	**Comments**
1.1 Is the source population or source area well described? •Was the country (e.g. developed or non-developed, type of health care system), setting (primary schools, community centres etc), location (urban, rural), population demographics etc adequately described?	++ + - NR NA	
1.2 Is the eligible population or area representative of the source population or area? •Was the recruitment of individuals, clusters or areas well defined (e.g. advertisement, birth register)? •Was the eligible population representative of the source? Were important groups underrepresented?	++ + - NR NA	
1.3 Do the selected participants or areas represent the eligible population or area? •Was the method of selection of participants from the eligible population well described? •What % of selected individuals or clusters agreed to participate? Were there any sources of bias? •Were the inclusion or exclusion criteria explicit and appropriate?	++ + - NR NA	
Section 2: Method of selection of exposure (or comparison) group		
2.1 Selection of exposure (and comparison) group. How was selection bias minimised? •How was selection bias minimised?	++ + -	

	NR NA	
2.2 Was the selection of explanatory variables based on a sound theoretical basis? •How sound was the theoretical basis for selecting the explanatory variables?	++ + - NR NA	
2.3 Was the contamination acceptably low? •Did any in the comparison group receive the exposure? •If so, was it sufficient to cause important bias?	++ + - NR NA	
2.4 How well were likely confounding factors identified and controlled? •Were there likely to be other confounding factors not considered or appropriately adjusted for? •Was this sufficient to cause important bias?	++ + - NR NA	
2.5 Is the setting applicable to the UK? •Did the setting differ significantly from the UK?	++ + - NR NA	
Section 3: Outcomes		
3.1 Were the outcome measures and procedures reliable? •Were outcome measures subjective or objective (e.g. biochemically validated nicotine levels ++ vs self-reported smoking −)? •How reliable were outcome measures (e.g. inter- or intra-rater reliability scores)? •Was there any indication that measures had been validated (e.g. validated against a gold standard measure or assessed for content validity)?	++ + - NR NA	
3.2 Were the outcome measurements complete? •Were all or most of the study participants who met the defined study outcome definitions likely to have been identified?	++ + - NR NA	
3.3 Were all the important outcomes assessed? •Were all the important benefits and harms assessed? •Was it possible to determine the overall balance of benefits and harms of the intervention versus comparison?	++ + - NR NA	
3.4 Was there a similar follow-up time in exposure and comparison groups? •If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison. •Analyses can be adjusted to allow for differences in length of follow-up (e.g. using person-years).	++ + - NR NA	

3.5 Was follow-up time meaningful? •Was follow-up long enough to assess long-term benefits and harms? •Was it too long, e.g. participants lost to follow-up?	++ + - NR NA	
Section 4: Analyses		
4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)? •A power of 0.8 (i.e. it is likely to see an effect of a given size if one exists, 80% of the time) is the conventionally accepted standard. •Is a power calculation presented? If not, what is the expected effect size? Is the sample size adequate?	++ + - NR NA	
4.2 Were multiple explanatory variables considered in the analyses? •Were there sufficient explanatory variables considered in the analysis?	++ + - NR NA	
4.3 Were the analytical methods appropriate? •Were important differences in follow-up time and likely confounders adjusted for?	++ + - NR NA	
4.6 Was the precision of association given or calculable? Is association meaningful? •Were confidence intervals or p values for effect estimates given or possible to calculate? •Were CIs wide or were they sufficiently precise to aid decision-making? If precision is lacking, is this because the study is under-powered?	++ + - NR NA	
Section 5: Summary		
5.1 Are the study results internally valid (i.e. unbiased)? •How well did the study minimise sources of bias (i.e. adjusting for potential confounders)? •Were there significant flaws in the study design?	++ + - NR NA	
5.2 Are the findings generalisable to the source population (i.e. externally valid)? •Are there sufficient details given about the study to determine if the findings are generalisable to the source population? •Consider: participants, interventions and comparisons, outcomes, resource and policy implications.	++ + - NR NA	

[15]Appraisal form derived from: Jackson R, Ameratunga S, Broad J et al. (2006) The GATE frame: critical appraisal with pictures. Evidence Based Medicine 11: 35–8.

[16] Available from CPHE on request.

Appendix F- Self-Compassion Scale

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				**Almost always**
1	**2**	**3**	**4**	**5**

_____ 1. I'm disapproving and judgmental about my own flaws and inadequacies.

_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 5. I try to be loving towards myself when I'm feeling emotional pain.

_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 8. When times are really difficult, I tend to be tough on myself.

_____ 9. When something upsets me I try to keep my emotions in balance.

_____ 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____ 11. I'm intolerant and impatient towards those aspects of my personality I don't like.

_____ 12. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____ 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____ 14. When something painful happens I try to take a balanced view of the situation.

_____ 15. I try to see my failings as part of the human condition.

_____ 16. When I see aspects of myself that I don't like, I get down on myself.

_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I’m kind to myself when I’m experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I’m tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

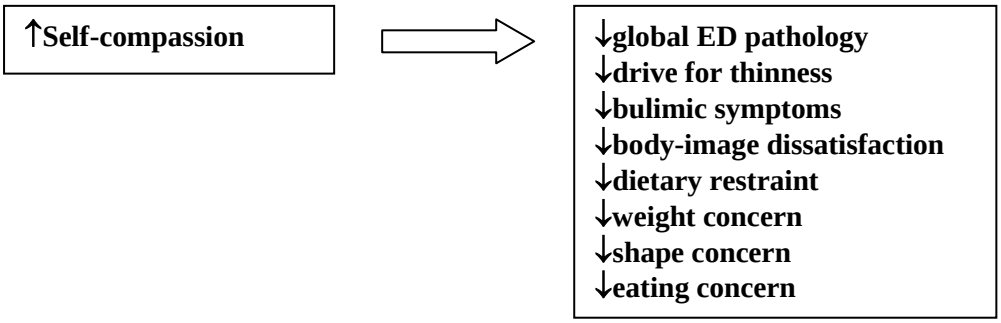
_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

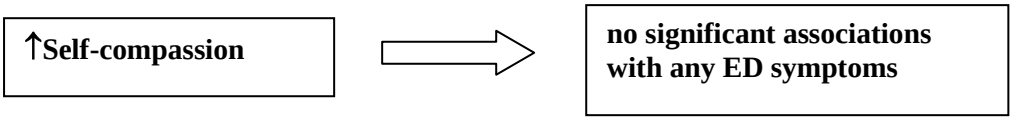
Appendix G- Overview of Results

Clinical Samples

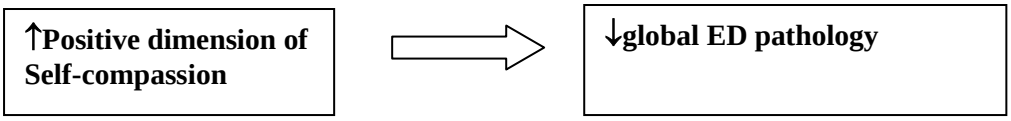
All Studies:
The following relationships were found to be significant within clinical ED samples:



Studies that controlled for self-esteem or BMI:
Given the potentially influential role of self-esteem and BMI, studies that controlled for at least one of these were examined separately. In this instance, no significant relationships between self-compassion and ED symptomatology were found in clinical samples.

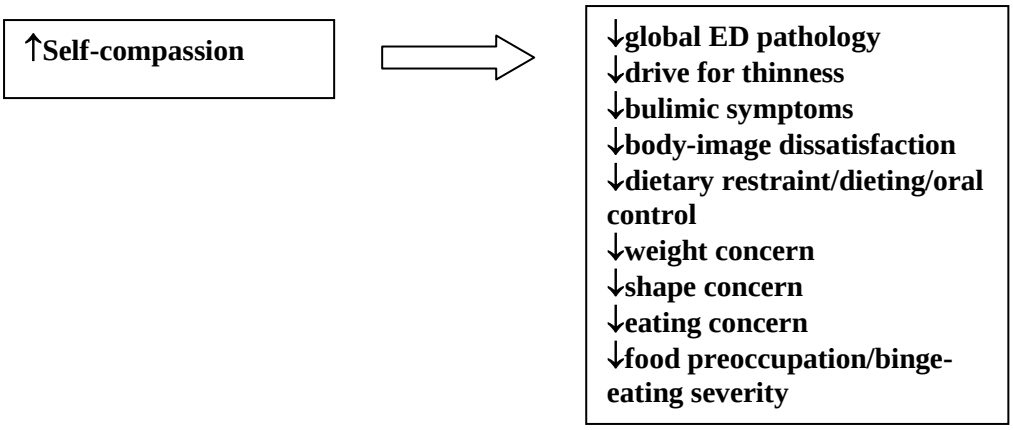


Studies that explored self-compassion subscales:
For a deeper exploration of the relationship between self-compassion and ED symptomatology, studies that examined self-compassion subscales were also examined separately. The following significant relationships were found.



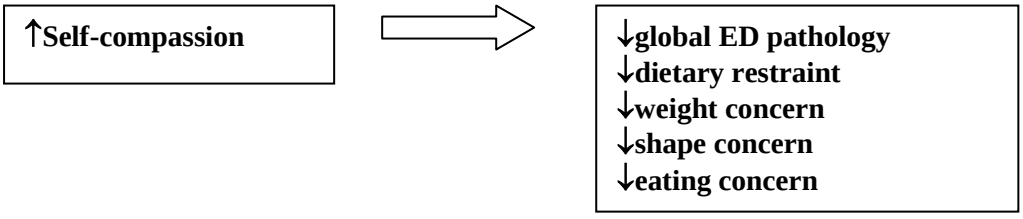
Non-clinical Samples

All studies:



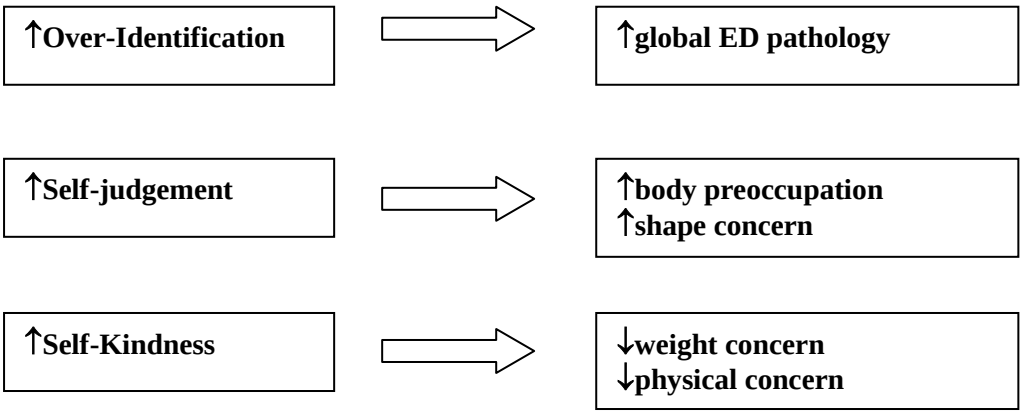
Studies that controlled for self-esteem or BMI:

Again, examining only studies that controlled for self-esteem or BMI, the following relationships remained significant.



Studies that explored self-compassion subscales:

For a deeper exploration of the relationship between self-compassion and ED symptomatology, studies that examined self-compassion subscales were also examined separately. The following significant relationships were found.



Appendix H- Operational definitions of shame

Internal shame: negative perception one holds of themselves

External shame: negative beliefs that one perceives others hold of them

Bodily shame: negative feelings associated with one's body

Current bodily shame: shame in relation to one's current body size

Anticipated bodily shame: anticipation of shame if one was to gain weight

References:

Burney, J. & Irwin, H.J. (2000) Shame and Guilt in Women with Eating Disorder Symptomatology. *Journal of Clinical Psychology*. 56(1),51-61

Gilbert P. (1998) What is shame? Some core issues and controversies. In *Shame: Interpersonal Behavior, Psychopathology and Culture*, Gilbert P, Andrews B (eds). Oxford University Press: New York; 3–38

Troop, N.A., Sotrilli, S., Serpell, L. & Treasure, J.L. (2006) Establishing a Useful Distinction Between Current and Anticipated Bodily Shame in Eating Disorders. *Eating and Weight Disorders*. 11(2),83-90

Appendix I- NHS Health Boards approached to support recruitment

NHS Lanarkshire

NHS Glasgow and Clyde

NHS Ayrshire and Arran

NHS Fife

NHS Tayside

NHS Dumfries and Galloway

NHS Lothian

NHS Forth Valley

NHS Grampian

NHS Highland

NHS Coventry and Warwickshire

Appendix J- Ethical Approval Letter

WoSRES
West of Scotland Research Ethics Service

NHS Greater Glasgow and Clyde

West of Scotland REC 5
Ground Floor - Tennent Building
Western Infirmary
38 Church Street
Glasgow
G11 6NT

Date 19 November 2015

Direct line 0141 211 2102
E-mail WoSREC5@ggc.scot.nhs.uk

Miss Lara Green
Trainee Clinical Psychologist
NHS Lanarkshire
Mental Health and Wellbeing, University of Glasgow
Gartnavel Royal Hospital, 1055 Great Western Road
Glasgow
G12 0XH

Dear Miss Green

Study title:	**Examining the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder**
REC reference:	**15/WS/0235**
Protocol number:	**n/a**
IRAS project ID:	**181781**

Thank you for your letter of 06 November 2015, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager, Mrs Sharon Macgregor, WoSREC5@ggc.scot.nhs.uk.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.
Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett (catherineblewett@nhs.net), the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Letter from funder [letter from university]		19 May 2015
Letter from sponsor [sponsor confirmation]		28 August 2015

Other [How to Participate Form]	1	17 August 2015
Participant consent form [Consent Form]	1	17 August 2015
Participant information sheet (PIS) [Participant Information sheet]	2	17 August 2015
REC Application Form [REC_Form_30092015]		30 September 2015
Research protocol or project proposal [Study Protocol]	1	07 September 2015
Response to Request for Further Information [email]		06 November 2015
Summary CV for Chief Investigator (CI) [L.Green CV]		
Summary CV for supervisor (student research) [supervisor CV]		
Summary, synopsis or diagram (flowchart) of protocol in non technical language [Plain English Summary]	1	07 September 2015
Validated questionnaire [Questionnaire Pack]	2	06 November 2015

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

With the Committee's best wishes for the success of this project.

Yours sincerely

for
Dr Stewart
Campbell
Chair

Appendix K- NHS Lanarkshire R&D Approval

Miss Lara Green
Trainee Clinical Psychologist
Mental Health & Wellbeing
University of Glasgow
Gartnavel Royal Hospital
1055 Great Western Road
GLASGOW
G12 0XH

R&D Department
Corporate Services Building
Monklands Hospital
Monkscourt Avenue
AIRDRIE
ML6 0JS

Date 07.12.15
Enquiries to Elizabeth McGonigal,
R&D Facilitator
Direct Line 01236 712459
Email elizabeth.mcgonigal@lanarkshire.scot.nhs.uk

Dear Miss Green

Project title: Examining the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder

R&D ID: L15038

NRS ID NUMBER: NRS15/181781

I am writing to you as Chief Investigator of the above study to advise that R&D Management approval has been granted for the conduct of your study within NHS Lanarkshire as detailed below:

NAME	TITLE	ROLE	NHSL SITE TO WHICH APPROVAL APPLIES
Miss Lara Green	Trainee Clinical Psychologist	Local Collaborator / Principal Investigator	NHS Lanarkshire

As you are aware, NHS Lanarkshire has agreed to be the Sponsor for your study. On its behalf, the R&D Department has a number of responsibilities; these include ensuring that you understand your own role as Chief Investigator of this study. To help with this we have outlined the responsibilities of the Chief Investigator in the attached document for you information.

All research projects within NHS Lanarkshire will be subject to annual audit via a questionnaire that we will ask you to complete. In addition, we are required to carry out formal monitoring of a proportion of projects, in particular those projects that are Sponsored by NHS Lanarkshire. In either case, you will find it helpful to maintain a well organised Site File. You may find it helpful to use the folder that we have included for that purpose.

For the study to be carried out you are subject to the following conditions:

Conditions

- You are required to comply with Good Clinical Practice, Ethics Guidelines, Health & Safety Act 1999 and the Data Protection Act 1998.
- The research is carried out in accordance with the Scottish Executive's Research Governance Framework for Health and Community Care (copy available via the Chief Scientist Office website: http://www.cso.scot.nhs.uk/ or the Research & Development Intranet site: http://firstport2/staff-support/research-and-development/default.aspx
- You must ensure that all confidential information is maintained in secure storage. You are further obligated under this agreement to report to the NHS Lanarkshire Data Protection Office and the Research & Development Office infringements, either by accident or otherwise, which constitutes a breach of confidentiality.
- Clinical trial agreements (if applicable), or any other agreements in relation to the study, have been signed off by all relevant signatories.
- You must contact the Lead Nation Coordinating Centre if/when the project is subject to any minor or substantial amendments so that these can be appropriately assessed, and approved, where necessary.
- You notify the R&D Department if any additional researchers become involved in the project within NHS Lanarkshire
- You notify the R&D Department when you have completed your research, or if you decide to terminate it prematurely.
- You must send brief annual reports followed by a final report and summary to the R&D office in hard copy and electronic formats as well as any publications.
- If the research involves any investigators who are not employed by NHS Lanarkshire, but who will be dealing with NHS Lanarkshire patients, there may be a requirement for an SCRO check and occupational health assessment. If this is the case then please contact the R&D Department to make arrangements for this to be undertaken and an honorary contract issued.

I trust these conditions are acceptable to you.

Yours sincerely,

Raymond Hamill – Corporate R&D Manager

Appendix L- NHS Glasgow R&D Approval

Administrator: Mrs Elaine O'Neill
Telephone Number: 0141 211 1743
E-Mail: elaine.o'neill2@ggc.scot.nhs.uk
Website: www.nhsggc.org.uk/r&d

R&D Management Office
Western Infirmary
Tennent Institute
1st Floor 38 Church Street
Glasgow, G11 6NT,

3 December 2015

Miss Lara Green
Trainee Clinical Psychologist
Mental Health and Wellbeing
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH

NHS GG&C Board Approval

Dear Miss Green

Study Title:	**Examining the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder**
Principal Investigator:	**Miss Lara Green**
GG&C HB site	**Adult Eating Disorder Service**
Sponsor	**NHS Lanarkshire**
R&D reference:	**GN15AM474**
REC reference:	**15/WS/0235**
Protocol no:	**V1; 07/09/15**

I am pleased to confirm that Greater Glasgow & Clyde Health Board is now able to grant **Approval** for the above study.

Conditions of Approval

1. **For Clinical Trials** as defined by the Medicines for Human Use Clinical Trial Regulations, 2004

   a. During the life span of the study GGHB requires the following information relating to this site i. Notification of any potential serious breaches.
   ii. Notification of any regulatory inspections.

It is your responsibility to ensure that all staff involved in the study at this site have the appropriate GCP training according to the GGHB GCP policy (www.nhsggc.org.uk/content/default.asp?page=s1411), evidence of such training to be filed in the site file.

2. **For all studies** the following information is required during their lifespan. a. Recruitment Numbers on a monthly basis
   b. Any change of staff named on the original SSI form c. Any amendments – Substantial or Non Substantial
   d. Notification of Trial/study end including final recruitment figures e. Final Report & Copies of Publications/Abstracts

Please add this approval to your study file as this letter may be subject to audit and monitoring.

Your personal information will be held on a secure national web-based NHS database.

I wish you every success with this research study

Yours sincerely,

Mrs Elaine O'Neill
Senior Research Administrator

Appendix M- NHS Fife R&D Approval

Medical Director

Hayfield House
Hayfield Road
KIRKCALDY
KY2 5AH

NHS Fife

Miss Lara Green
Trainee Clinical Psychologist
NHS Lanarkshire
Mental Health & Wellbeing
University of Glasgow
Gartnavel Royal Hospital
1055 Great Western Road
GLASGOW G12 OXH

Date 26 January 2016
Our Ref 15-090 181781
15/WS/0235
Enquiries to Aileen Yell
E-mail aileenyell@nhs.net
Telephone 01383 623623 Ext 20940
Website www.nhsfife.org

Dear Miss Green

Project Title: Examining the relationship between compulsive exercise and shame in individuals with an eating disorder

Thank you for your application to carry out the above project. Your project documentation (detailed below) has been reviewed for resource and financial implications for NHS Fife and I am happy to inform you that NHS permission for the above research has been granted on the basis described in the application form, protocol and supporting documentation. The documents reviewed were:

Document	Version	Date
How to Participate Form	1	17 August 2015
Participant Information Sheet	2	17 August 2015
Participant Consent Form	1	17 August 2015
Protocol	1	7 September 2015
Flowchart	1	7 September 2015
IRAS R&D Form	5.0.0	24 September 2015
Questionnaire Pack	2	6 November 2015
REC final favourable opinion letter		19 November 2015
UK Study Wide Governance Report		27 November 2015
IRAS SSI Form	5.2.0	5 December 2015

The terms of the approval state that you are the Principal Investigator authorised to undertake this study within NHS Fife, with assistance from Dr Suzanne Deas at Lynebank Hospital who will identify and approach potential participants and hand out study information. Those who are willing to take part will be invited to complete a series of questionnaires either online or by post from their home.

I note that the favourable ethical opinion applies to all NHS sites taking part in the study therefore no separate Site Specific Review is required in this case. The sponsors for this study are NHS Lanarkshire

Details of our participation in studies will be included in annual returns we are expected to complete as part of our agreement with the Chief Scientist Office. Regular reports of the study require to be submitted. Your first report should be submitted to Dr A Wood, R&D Manager, R&D Department, Queen Margaret Hospital, Whitefield Rd, Dunfermline, KY12 OSU (Amanda.wood3@nhs.net) in 12 months time and subsequently at yearly intervals until the work is completed. A Lay Summary will also be required upon completion of the project.

Appendix N- NHS Coventry and Warwickshire R&D Approval

Coventry and Warwickshire NHS Partnership Trust

NIHR Clinical Research Network: West Midlands
Unit 26/27, Business Innovation Centre
Binley Business Park
Harry Weston Road
Coventry
CV3 2TX

22 February 2016

Miss Lara Green
NHS Lanarkshire
Mental Health and Wellbeing
University of Glasgow
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow
G12 0XH

Dear Miss Green

Project Title: **Compulsive Exercise and Shame in Eating Disorders**
R&D Ref: **CWPT191115 (181781)**
REC Ref: **154/EE/0392**

I am pleased to inform you that the R&D review of the above project is complete, and NHS permission has been granted for the study at Coventry and Warwickshire Partnership NHS Trust. The details of your study have now been entered onto the Trust's database.

The permission has been granted on the basis described in the application form, protocol and supporting documentation. The documents reviewed were:

Document	Version	Date
R&D Form	181781/853703/14/282	
SSI Form	181781/887800/6/385/301371/336944	
Letter from funder [letter from university]		19 May 2015
Letter from sponsor [sponsor confirmation]		28 August 2015
Other [How to Participate Form]	1	17 August 2015
Participant consent form [Consent Form]	1	17 August 2015
Participant information sheet (PIS) [Participant Information sheet]	2	17 August 2015
REC Application Form [REC_Form_30092015]		30 September 2015
REC Approval Letter		19 November 2015
Research protocol or project proposal [Study Protocol]	1	07 September 2015
Summary, synopsis or diagram (flowchart) of protocol in non-technical language [Plain English Summary]	1	07 September 2015
Validated questionnaire [Questionnaire Pack]	2	06 November 2(

All research must be managed in accordance with the requirements of the Department of Health's Research Governance Framework (RGF), to ICH-GCP standards (if applicable) and to NHS Trust policies and procedures. Permission is only granted for the activities agreed by the relevant authorities.

All amendments (including changes to the local research team and status of the project) need to be submitted to the REC and the R&D office in accordance with the guidance in IRAS. Any urgent safety measures required to protect research participants against immediate harm can be implemented immediately. You should notify the R&D Office within the same time frame as any other regulatory bodies.

It is your responsibility to keep the R&D Office and Sponsor informed of all Serious Adverse Events. All SAEs must be reported within the timeframes detailed within ICH-GCP statutory instruments and EU directives.

In order to ensure that research is carried out to the highest governance standards, the Trust employs the services of an external monitoring organisation to provide assurance. Your study may be randomly selected for audit at any time, and you must co-operate with the auditors. Action may be taken to suspend Trust approval if the research is not run in accordance with RGF or ICH-GCP standards, or following recommendations from the auditors.

I wish you well with your project. Please do not hesitate to contact me should you need any guidance or assistance.

Yours sincerely

Elizabeth Vassell
Research Support Facilitator

Appendix O- Ethics Approval of Minor Amendment

WoSRES
West of Scotland Research Ethics Service

Miss Lara Green
Trainee Clinical Psychologist
NHS Lanarkshire
Mental Health and Wellbeing,
University of Glasgow
Gartnavel Royal Hospital,
1055 Great Western Road
Glasgow
G12 0XH

West of Scotland REC 5
West Ambulatory Care Hospital
Dalnair Street
Yorkhill
Glasgow
www.nhsggc.org.uk

Date 26 February 2016
Direct line 0141-232-1807
e-mail Wosrec5@ggc.scot.nhs.uk

Dear Miss Green

Study title: **Examining the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder**
REC reference: **15/WS/0235**
Protocol number: **n/a**
Amendment number: **AM01**
Amendment date: **19 February 2016**
IRAS project ID: **181781**

Thank you for your letter of 19 February 2016, notifying the Committee of the above amendment. The amendment refers to the inclusion of the supervisor's details to the PIS as a point of contact for complaints.

The Committee does not consider this to be a “substantial amendment“ as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

Document	*Version*	*Date*
Notice of Minor Amendment [Email from CI]	AM01	19 February 2016
Participant information sheet (PIS)	3	11 February 2016

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

15/WS/0235: **Please quote this number on all correspondence**

Yours sincerely

Sophie Bagnall Assistant Coordinator

Appendix P- Sponsor Approval of Minor Amendment

R&D Department
Corporate Services Building
Monklands Hospital
Monkscourt Avenue
AIRDRIE
ML6 0JS

Miss Lara Green
Trainee Clinical Psychologist
Mental Health & Wellbeing
University of Glasgow
Gartnavel Royal Hospital
1055 Great Western Road
GLASGOW
G12 0XH

21 March 2016
Elizabeth McGonigal, R&D Facilitator
01236 712459
elizabeth.mcgonigal@lanarkshire.scot.nhs.uk

Dear Lara

Project title: Examining the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder

R&D ID: L15038	**Ethics number: 15/WS/0235**
Amendment number: AM01 19 February 2016	**Ethics acknowledgement date: 26.02.16**
Local PI/Collaborator: Lara Green	**NHSL Site(s): NHS Lanarkshire**

I am writing to you as Chief Investigator of the above study in reference to the above Amendment as acknowledged in the Ethics Approval letter dated 26 February 2016. Any documents approved are listed in Table 1, overleaf.

I confirm that your original R&D Management Approval has not been affected by this Amendment, and it can therefore be implemented within NHS Lanarkshire as detailed above, subject to **all** regulatory approvals. NHS Lanarkshire reserves the right to revoke Management Approval should any unfavourable opinions be received.

I note that it is the responsibility of the Principal Investigator(s) to carry out any changes to be made to the project as a result.

Yours sincerely,

Raymond Hamill – Corporate R&D Manager
cc. – see overleaf

PLEASE NOTE: It is the responsibility of the Principal Investigator to inform the R&D Department of any significant findings identified as a result of a Monitoring Visit.

Table 1. Documents approved by the NHS REC as part of this amendment

☑ The following documents were approved as part of the amendment:

Document	*Version*	*Date*
Notice of Minor Amendment [Email from CI]	AM01	19 February 2016
Participant information sheet (PIS)	3	11 February 2016

c.c.

NAME	TITLE	CONTACT ADDRESS	ROLE
Raymond Hamill	Corporate R&D Manager	NHS Lanarkshire	Sponsor Contact
Dr Jo Waine	Consultant Clinical Psychologist	NHS Lanarkshire	Named Contact

Appendix Q- DSM-V Criteria for Eating Disorders

Anorexia-Nervosa

a. Persistent restriction of energy intake leading to significantly low body weight (in context of what is minimally expected for age, sex, developmental trajectory, and physical health).
b. Either an intense fear of gaining weight or of becoming fat, or persistent behaviour that interferes with weight gain (even though significantly low weight).
c. Disturbance in the way one's body weight or shape is experienced, undue influence of body shape and weight on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

Bulimia-Nervosa

a. Recurrent episodes of binge eating....Eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances.... A sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating).
b. Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, or other medications, fasting, or excessive exercise.
c. The binge eating and inappropriate compensatory behaviours both occur, on average, at least once a week for three months.
d. Self-evaluation is unduly influenced by body shape and weight.
e. The disturbance does not occur exclusively during episodes of Anorexia Nervosa

Other-Specified Feeding or Eating Disorder

a. Atypical Anorexia Nervosa: All criteria are met, except despite significant weight loss, the individual's weight is within or above the normal range.
b. Binge Eating Disorder (of low frequency and/or limited duration)**:** All of the criteria for BED are met, except at a lower frequency and/or for less than three months.
c. Bulimia Nervosa (of low frequency and/or limited duration): All of the criteria for Bulimia Nervosa are met, except that the binge eating and inappropriate compensatory behaviour occurs at a lower frequency and/or for less than three months.
d. Purging Disorder: Recurrent purging behaviour to influence weight or shape in the absence of binge eating

Binge-Eating Disorder

a. Recurrent episodes of binge eating. i.e Eating, in a discrete period of time an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances. A sense of lack of control over eating during the episode

b. Binge episodes are associated with three or more of the following: eating much more rapidly than normal; eating until feeling uncomfortably full; eating large amounts of food when not feeling physically hungry; eating alone because of feeling embarrassed by how much one is eating; feeling disgusted with oneself, depressed or very guilty afterward.

c. Binge eating occurs, on average, at least once a week for three months and causes marked distress

d. Binge eating not associated with the recurrent use of inappropriate compensatory behaviours

American Psychiatric Association. (2013) *Diagnostic and statistical manual of mental disorders (5th ed.).* Washington, DC: American Psychiatric Association

Appendix R- Power Calculation

The following calculation was completed using SAS v9.3.

Correlation	Nominal Power	N Total
0.4	0.80	46
0.4	0.85	53
0.4	0.90	61
0.5	**0.80**	**29**
0.5	0.85	32
0.5	0.90	37
0.6	0.80	19
0.6	0.85	21
0.6	0.90	24

Analysis conducted by:
Dr. Caroline E. Haig (Biostatistician)

Robertson Centre for Biostatistics
University of Glasgow
Boyd Orr Building, Level 11
University of Glasgow
Glasgow
G12 8QQ

Participant Information Sheet

You have been given this information sheet because your clinician has identified you as someone who may be eligible to take part in this study. This sheet outlines the most important information about the study.

Who is carrying out the study?
Lara Green is carrying out this study as part of her Doctorate in Clinical Psychology at Glasgow University. Her contact details are at the bottom of this information sheet. The study is being supervised by Dr Joanne Waine (Lanarkshire Tertiary Eating Disorder Specialist Service) and Alison Jackson (University of Glasgow)

What is the purpose of the study?
The study aims to look at the views and opinions of people with an eating disorder. In particular, we want to learn about how individuals view themselves, how they feel and what their attitudes are towards exercise. It is hoped that by exploring this, it will provide us with a greater understanding of what it is like to have an eating disorder and will help us think about effective treatments.

What will taking part in the study involve?
The study will involve completing a number of questionnaires either online or on paper. Questions will ask about your thoughts and feelings; particularly in relation to your exercise, your body and different social situations. The study should take approximately 20-30 minutes to complete.

After you have completed the study, the researcher will contact the lead clinician from your eating disorder service in order to get additional information regarding your diagnosis.

What will I get out of participating?
Although you may not benefit directly from participating in the study, the results will help inform eating disorder research and clinical practice. This will be useful for developing future treatments and supporting individuals with an eating disorder.

What will happen to the information collected?
All of the information collected will be kept anonymous. You will be given a participant number to help identify you and this will allow us to confirm your diagnosis with your clinician.

All contact details will be stored securely at the University of Glasgow and will be destroyed at the end of the study. The results will be written up in a report which will be submitted to the University of Glasgow Doctoral Course in Clinical Psychology. It is also planned that the research will be published in a suitable journal.

Will I be able to find out about the results of the study?
After completing the questionnaires you will be asked if you would like to receive a summary of the results when they are available. If you would like this, you will be asked to provide your contact details on a form which will be stored separately from the study data.

What should I do if I want to take part in the study?
If you would like to take part in the study you should follow the instructions included in the 'How to Participate form'.

Can I get support to complete the study?
If you have difficulty completing the study alone then you are welcome to get support from a close family member or friend.

What if I don't want to take part or if I change my mind about taking part?
You are under no obligation to take part in the study. If you do decide to take part but later change your mind, you will be able to withdraw from the study at any time. If you choose not to take part, or to withdraw from the study, this will in no way affect the clinical care you receive from the NHS.

What should I do if I would like more information before making up my mind?
If you have any questions or would like further information, please contact the researcher using the details below.

Contact Information:

Please contact Lara Green at any point if you have any questions. She can be contacted by email or post:

Email: l.green.1@research.gla.ac.uk

Address:
University of Glasgow
1st floor, Administration Building
Gartnavel Royal Hospital

1055 Great Western Road
Glasgow
G12 0XH

If you have any complaints about this study please contact,

Dr Jo Waine
Consultant Clinical Psychologist
Tertiary Eating Disorder Specialist Service
2nd Floor, Buchanan Centre
126-130 Main Street
Coatbridge
ML5 3BJ

How to Participate

Participant Number:.....

If you would like to take part in this study you can either follow the weblink below, or request a paper copy of the questionnaires.

Accessing via the weblink:

1. To access the weblink please open a new internet browser and enter the following address:

https://www.surveymonkey.com/r/B95RXDF

2. You will be asked to enter the participant number found at the top of this page

3. You will then be asked to tick a box to say you have read the participant information sheet and consent to taking part.

4. The study will then begin and you can work your way through the questions

Requesting paper copies:

1. Please complete the contact information sheet below and return it in the pre-paid envelope

2. The researcher will send copies of the questionnaires and a consent form to the address you provide

3. Please complete the consent form and questionnaires and return them in the pre-paid return envelope.

Contact Information:

Name .....

Address .....

.....
.....

Name of your eating disorder service .....

Name of your lead clinician .....

Participant Consent Form

Please read the participant information sheet before completing this consent form. If you have any questions about the study, or about this form, please contact the researcher (contact details are provided).

By signing this form, you are declaring that you:

Please Tick

1. Have read the participant information sheet and have had the opportunity to contact the researcher to ask questions about the study. ☐

2. Understand that you may withdraw from the study at any time and this will in no way affect your clinical care. ☐

3. Understand who will have access to personal data provided, how the data will be stored, and what will happen to the data at the end of the project. ☐

4. Understand that all information will be stored confidentially. ☐

5. Provide consent for the researcher to contact your lead clinician and collect information on current and previous diagnoses. ☐

6. Agree to participate in the study. ☐

Signature of participant:……. Date:……

Please print name:……..

Appendix V- Demographic Information Questionnaire

Demographic Information

1. What is your current age?
_____ years

2. What is your gender?
□ female □ male

2. Please describe your ethnicity by ticking one of the options below:

White	□British □ Irish □ Other	**Asian or Asian British**	□ Indian □ Pakistani □ Bangladeshi □ Chinese □ Other
Mixed	□ White / Black Africa □ White / Black Caribbean □ White / Asian □ Other	**Black**	□British □African □ Caribbean □ Other
Other Ethnic Origins	□		

3. Please indicate your current employment status by ticking one or more of the options below:

□ Employed full-time □ Employed part-time
□ Self-employed □ Unemployed
□ Full-time student □ Part-time student

Information about your Eating Disorder

4. How old were you when you were first diagnosed with an Eating Disorder?
____years

5. How long have you been receiving treatment for your Eating Disorder?
____years

Information about your Exercise Habits

6. On average, how many exercise sessions do you do in a week, e.g. how many times would you exercise?

____sessions per week

7. On average, how long in <u>minutes</u> does each exercise session last?

1-30	31-60	61-90	91-120	121-150	151-180	180+
□	□	□	□	□	□	□

8. On average, how intense (i.e. how hard) was each exercise session?

Mild	Moderate	Hard
□	□	□

9. Do you feel your exercise is a problem?

□ yes □ no □ don't know

Appendix W- Compulsive Exercise Test

Listed below are a series of statements regarding exercise. Please read each statement carefully and select the number that best indicates how true each statement is of you. Please answer all the questions as honestly as you can.

Never true	Rarely true	Sometimes true	Often true	Usually true	Always true
0	**1**	**2**	**3**	**4**	**5**

1)	I feel happier and/or more positive after I exercise.	0	1	2	3	4	5
2)	I exercise to improve my appearance.	0	1	2	3	4	5
3)	I like my days to be organised and structured of which exercise is just one part.	0	1	2	3	4	5
4)	I feel less anxious after I exercise.	0	1	2	3	4	5
5)	I find exercise a chore.	0	1	2	3	4	5
6)	If I feel I have eaten too much, I will do more exercise.	0	1	2	3	4	5
7)	My weekly pattern of exercise is repetitive.	0	1	2	3	4	5
8)	I do not exercise to be slim.	0	1	2	3	4	5
9)	If I cannot exercise I feel low or depressed.	0	1	2	3	4	5
10)	I feel extremely guilty if I miss an exercise session.	0	1	2	3	4	5
11)	I usually continue to exercise despite injury or illness, unless I am very ill or too injured.	0	1	2	3	4	5
12)	I enjoy exercising.	0	1	2	3	4	5
13)	I exercise to burn calories and lose weight.	0	1	2	3	4	5
14)	I feel less stressed and/or tense after I exercise.	0	1	2	3	4	5
15)	If I miss an exercise session, I will try and make up for it when I next exercise.	0	1	2	3	4	5
16)	If I cannot exercise I feel agitated and/or irritable.	0	1	2	3	4	5
17)	Exercise improves my mood.	0	1	2	3	4	5
18)	If I cannot exercise, I worry that I will gain weight.	0	1	2	3	4	5
19)	I follow a set routine for my exercise sessions e.g. walk or run the same route, particular exercises, same amount of time, and so on.	0	1	2	3	4	5
20)	If I cannot exercise I feel angry and/or frustrated.	0	1	2	3	4	5
21)	I do not enjoy exercising.	0	1	2	3	4	5

22)	I feel like I've let myself down if I miss an exercise session.	0	1	2	3	4	5
23)	If I cannot exercise I feel anxious.	0	1	2	3	4	5
24)	I feel less depressed or low after I exercise.	0	1	2	3	4	5

Appendix X- Other as a Shamer Scale

We are interested in how people think others see them. Below is a list of statements describing feelings or experiences about how you may feel other people see you.

Read each statement carefully and select the number to the right of the item that indicates the frequency with which you find yourself feeling or experiencing what is described in the statement. Use the scale below.

Never	Seldom	Sometimes	Frequently	Almost Always
0	**1**	**2**	**3**	**4**

1. I feel other people see me as not good enough.	0	1	2	3	4
2. I think that other people look down on me	0	1	2	3	4
3. Other people put me down a lot	0	1	2	3	4
4. I feel insecure about others opinions of me	0	1	2	3	4
5. Other people see me as not measuring up to them	0	1	2	3	4
6. Other people see me as small and insignificant	0	1	2	3	4
7. Other people see me as somehow defective as a person	0	1	2	3	4
8. People see me as unimportant compared to others	0	1	2	3	4
9. Other people look for my faults	0	1	2	3	4
10. People see me as striving for perfection but being unable to reach my own standards	0	1	2	3	4
11. I think others are able to see my defects	0	1	2	3	4
12. Others are critical or punishing when I make a mistake	0	1	2	3	4
13. People distance themselves from me when I make mistakes	0	1	2	3	4
14. Other people always remember my mistakes	0	1	2	3	4
15. Others see me as fragile	0	1	2	3	4
16. Others see me as empty and unfulfilled	0	1	2	3	4
17. Others think there is something missing in me	0	1	2	3	4
18. Other people think I have lost control over my body and feelings	0	1	2	3	4

Appendix Y- Test of Self-Conscious Affect

Below are situations that people are likely to encounter in day-to-day life, followed by several common reactions to those situations.
As you read each scenario, try to imagine yourself in that situation. Then indicate how likely you would be to react in each of the ways described. We ask you to rate all responses because people may feel or react more than one way to the same situation, or they may react different ways at different times.

Not Likely				Very Likely
1	**2**	**3**	**4**	**5**

For example:
A. You wake up early one Saturday morning. It is cold and rainy outside.

a) You would telephone a friend to catch up on news. **(1)** 2 3 4 5

b) You would take the extra time to read the paper. 1 2 3 4 **(5)**

c) You would feel disappointed that it's raining. 1 2 **(3)** 4 5

d) You would wonder why you woke up so early. 1 2 3 **(4)** 5

In the above example, I've rated ALL of the answers by circling a number. I selected "1" for answer (a) because I wouldn't want to wake up a friend very early on a Saturday morning -- so it's not at all likely that I would do that. I selected "5" for answer (b) because I almost always read the paper if I have time in the morning (very likely). I selected "3" for answer (c) because for me it's about half and half. Sometimes I would be disappointed about the rain and sometimes I wouldn't -- it would depend on what I had planned. And I selected "4" for answer (d) because I would probably wonder why I had awakened so early.

Please do not skip any items -- rate all responses.

1. You make plans to meet a friend for lunch. At five o'clock, you realize you have stood your friend up.

a) You would think: "I'm inconsiderate." 1 2 3 4 5

b) You'd think you should make it up to your friend as soon as possible. 1 2 3 4 5

c) You would think: "My boss distracted me just before lunch." 1 2 3 4 5

2. You break something at work and then hide it.

a) You would think: "This is making me anxious. I need to either fix it or get someone else to." 1 2 3 4 5

b) You would think about quitting. 1 2 3 4 5

c) You would think: “A lot of things aren’t made very well these days.” 1 2 3 4 5

3. At work, you wait until the last minute to plan a project, and it turns out badly.

a) You would feel incompetent. 1 2 3 4 5

b) You would think: “There are never enough hours in the day.” 1 2 3 4 5

c) You would feel: “I deserve to be reprimanded for mismanaging the project.” 1 2 3 4 5

4. You make a mistake at work and find out a co-worker is blamed for the error.

a) You would think the company did not like the co-worker. 1 2 3 4 5

b) You would keep quiet and avoid the co-worker. 1 2 3 4 5

c) You would feel unhappy and eager to correct the situation. 1 2 3 4 5

5. While playing around, you throw a ball, and it hits your friend in the face.

a) You would feel inadequate that you can’t even throw a ball. 1 2 3 4 5

b) You would think maybe your friend needs more practice at catching. 1 2 3 4 5

c) You would apologize and make sure your friend feels better. 1 2 3 4 5

6. You are driving down the road, and you hit a small animal.

not likely very likely

a) You would think the animal shouldn’t have been on the road. 1 2 3 4 5

b) You would think: “I’m terrible.” 1 2 3 4 5

c) You’d feel bad you hadn’t been more alert driving down the road. 1 2 3 4 5

7. You walk out of an exam thinking you did extremely well, then you find out you did poorly.

not likely very likely

a) You would think: “The instructor doesn’t like me.” 1 2 3 4 5

b) You would think: “I should have studied harder.” 1 2 3 4 5

c) You would feel stupid. 1 2 3 4 5

8. While out with a group of friends, you make fun of a friend who’s not there.

not likely very likely

a) You would feel small...like a rat. 1 2 3 4 5

b) You would think that perhaps that friend should have been there to defend himself/herself. 1 2 3 4 5

c) You would apologize and talk about that person's good points. 1 2 3 4 5

9. You make a big mistake on an important project at work. People were depending on you, and your boss criticizes you.

	not likely				very likely
a) You would think your boss should have been more clear about what was expected of you.	1	2	3	4	5
b) You would feel as if you wanted to hide.	1	2	3	4	5
c) You would think: "I should have recognized the problem and done a better job."	1	2	3	4	5

10. You are taking care of your friend's dog while they are on vacation. and the dog runs away.

	not likely				very likely
a) You would think, "I am irresponsible and incompetent."	1	2	3	4	5
b) You would think your friend must not take very good care of her dog or it wouldn't have run away.	1	2	3	4	5
c) You would vow to be more careful next time.	1	2	3	4	5

11. You attend your co-worker's housewarming party, and you spill red wine on a new cream coloured carpet, but you think no one notices.

	not likely				very likely
a) You would stay late to help clean up the stain after the party.	1	2	3	4	5
b) You would wish you were anywhere but at the party.	1	2	3	4	5
c) You would wonder why your co-worker chose to serve red wine with the new light carpet.	1	2	3	4	5

Appendix Z- Bodily Shame Scale

Below is a list of ways that some people may feel about weight and shape. Please indicate the degree to which you agree with each item by circling the appropriate number where 0 = *strongly disagree*, 1 = *disagree*, 2 = *mixed feelings*, 3 = *agree* and 4 = *strongly agree*.

Please try to be honest with your answers and report how you *actually* feel rather than how you think you *ought* to feel.

Strongly Disagree	Disagree	Mixed Feelings	Agree	Strongly Agree
0	**1**	**2**	**3**	**4**

1. I would feel ashamed if I was to put on weight	0	1	2	3	4
2. I am embarrassed about my physical appearance	0	1	2	3	4
3. I am ashamed of my body	0	1	2	3	4
4. If I gained weight I would feel I had let myself down	0	1	2	3	4
5. I keep parts of my body covered up because I hate them so much	0	1	2	3	4
6. I feel self-conscious if people comment on my appearance	0	1	2	3	4
7. I would not think less of myself if I was overweight	0	1	2	3	4
8. I avoid changing in communal changing areas (e.g. the gym)	0	1	2	3	4

Appendix AA- Hospital Anxiety and Depression Scale

Read each item carefully and select the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

Never	Sometimes	Frequently	Almost Always
0	**1**	**2**	**3**

1. I feel tense or wound up	0	1	2	3
2. I get a sort of frightened feeling as if something bad is about to happen	0	1	2	3
3. Worrying thoughts go through my mind	0	1	2	3
4. I can sit at ease and feel relaxed	0	1	2	3
5. I get a sort of frightened feeling like butterflies in the stomach	0	1	2	3
6. I feel restless and have to be on the move	0	1	2	3
7. I get sudden feelings of panic	0	1	2	3
8. I still enjoy the things I used to enjoy	0	1	2	3
9. I can laugh and see the funny side of things	0	1	2	3
10. I feel cheerful	0	1	2	3
11. I feel as if I am slowed down	0	1	2	3
12. I have lost interest in my appearance	0	1	2	3
13. I look forward with enjoyment to things	0	1	2	3
14. I can enjoy a good book or radio or TV program	0	1	2	3

Appendix BB- Results from Mann-Whitney U-tests

Mann-Whitney U-tests comparing individuals with AN and BN across study variables. No significant difference between diagnostic groups was found.

	CET	**OAS**	**TOSCA-shame**	**BSS-anticipated**	**BSS-current**	**HADS-anxiety**	**HADS-depression**
Mann-Whitney U-value	25	35.5	28	19	19	34.5	35.5
Significance value	.219	.759	.331	.073	.077	.690	.765

Note: CET- Compulsive Exercise Test; OAS- Other As Shamer Scale; TOSCA- Test of Self-Conscious Affect' BSS- Bodily Shame Scale; HADS-Hospital Anxiety and Depression Scale

Appendix CC - Comparison of current outcomes to past research

Means (M) and standard deviations (SD) for measures of shame and CE in the present study, compared with previous clinical and non-clinical findings.

	Measure Range	**Current Findings**		**Previous Research: Clinical**		**Previous Research: Non-clinical**	
		M	***SD***	***M***	***SD***	***M***	***SD***
CET	*0-25*	14.2	3.9	*No clinical studies using CET in adults with an ED*		11.7 *(Taranis et al., 2011)*	2.7
OAS	*0-72*	40.8	15.9	39.3 *(Troop et al., 2008)*	14.5	20 *(Goss et al., 1994)*	10.1
TOSCA	*11-55*	43.85	8.15	*No clinical studies using TOSCA in adults with an ED*		43.3 *(Gee & Troop, 2003)*	8.8
BSS - current **- anticipated**	*0-4*	3.2 3.3	0.8 0.7	2.8 3.2 *(Troop et al., 2006)*	1.0 0.9	1.8 2.3 *(Troop et al., 2006)*	0.9 0.9

Note: CET- Compulsive Exercise Test; OAS- Other As Shamer Scale; TOSCA- Test of Self-Conscious Affect' BSS- Bodily Shame Scale

Gee, A. & Troop, N.A (2003) Shame, depressive symptoms and eating, weight and shape concerns in a non-clinical sample. *Eating and Weight Disorders*. 8,72-75

Goss, K., Gilbert, P. & Allan, S. (1994) An exploration of shame measures: I: The 'other as shamer'scale. *Personality and Individual Differences*. 17,713-717

Taranis, L, Touyz, S. & Meyer, C. (2011) Disordered eating and exercise: development and preliminary validation of the compulsive exercise test (CET). *European Eating Disorder Review*. 19(3),256-68

Troop, N.A., Allan, S., Serpell, L. & Treasure, J.L. (2008) Shame in Women with a History of Eating Disorders. *European Eating Disorders Review*. 16,480-488

Troop, N.A., Sotrilli, S., Serpell, L. & Treasure, J.L. (2006) Establishing a Useful Distinction Between Current and Anticipated Bodily Shame in Eating Disorders. *Eating and Weight Disorders*. 11(2),83-90

Appendix DD- Study Protocol

Study Title Examining the Relationship between Compulsive Exercise and Shame in Individuals with an Eating Disorder

Chief Investigator: Lara Green

Address: Institute of Mental Health and Wellbeing, Gartnavel Royal Hospital, 1055 Great Western Road, Glasgow, G12 0XH
Email: l.green.1@research.gla.ac.uk
*Telephon*e: 07892711395

Abstract

Previous research has found that individuals with an eating disorder (ED) tend to experience higher levels of shame than those in the general population. Similarly, compulsive exercise has also been found to be a common feature among individuals with an ED. Very little research has examined the link between these two phenomenon and therefore this study aims to examine whether there is a relationship between shame and compulsive exercise in an ED population. The study will recruit 64 individuals aged 16 or over, who have a diagnosis of either Anorexia-nervosa, Bulimia-nervosa, Binge-eating disorder or Other Specified Feeding or Eating Disorder, and are open to mental health services for treatment. Participants will be asked to complete a series of questionnaires examining their attitudes and feelings towards exercise and shame, as well as additional questions regarding demographic information and mood. The results will be examined to determine whether there is a relationship between compulsive exercise and shame in an ED population. Post-hoc analysis will also explore the relationship with regards to individual facets of shame and ED symptomatology.

1.Rationale

1.1 Eating Disorders in the UK

Eating Disorders (ED) are a chronic mental health problem known to be associated with high co-morbidity, negative physical and psychological outcomes and high mortality rates (Arcelus et al. 2011; Field et al. 2012). Within the DSM-5 there are 5 main categories of ED; Anorexia-nervosa (AN), Bulimia-nervosa (BN), Other Specified Feeding or Eating Disorder (OSFED) and Binge-Eating Disorder (BED) (APA, 2013). Current annual incidence rates of individuals with a diagnosed ED in the UK are reported to be approximately 36.8 per 100,000 (Micali et al. 2013), with 90% of those female (Royal College of Psychiatrists', 2012).

1.2 Shame and EDs

Shame can be described as a 'self-conscious emotion', arising in response to negative self-reflection and a feeling of inadequacy or failure (Burney & Irwin, 2000). Within an ED population, there has been considerable evidence to suggest a positive relationship between eating pathology and the tendency to experience shame (Burney & Irwin, 2000; Sanftner et al. 1995; Frank, 1991).

Shame can be further defined as either internal or external; e.g. feeling ashamed versus being shamed (Gilbert, 1998). Internal shame refers to a feeling one assigns to themselves; whereas external shame describes how one believes others may perceive them. With regards to psychopathology, a study of non-clinical females by Gee & Troop (2003) found depression to be uniquely associated with external shame, while eating pathology was associated with internal shame. Within individuals with a history of ED, this was further refined to suggest that external shame was associated with symptoms of AN while internal shame was associated with BN (Troop et al. 2008).

Research has also shown that shame, specifically in relation to the body, is predictive of eating pathology both in clinical and non-clinical populations (Doran & Lewis, 2012; Burney & Irwin (2000). In particular, a longitudinal study by Troop & Redshaw (2012) found levels of bodily shame uniquely predicted increases in AN symptoms over 2.5 years.

These studies have numerous benefits in terms of understanding the aetiology and presentation of shame in the EDs, however caution must be taken when comparing results to

a clinical population. The majority of the aforementioned studies use non-clinical populations or self-report measures as a means of confirming ED symptomatology. While many self-report measures hold clinical utility, researchers have stressed the need for future studies to confirm ED diagnosis through formal clinical assessment (Troop et al. 2008)

1.3 Compulsive Exercise and ED

Elevated activity levels are a common feature among individuals with AN (Beumont et al. 1994) and are associated with a lower minimum BMI, earlier age of onset, greater levels of anxiety, perfectionism and obsessive compulsive disorder, and greater ED symptomatology (Shroff et al. 2006). With regards to recovery, increased exercise levels have also been linked to poorer prognosis at two years (Rigaud et al. 2011), increased risk of relapse (Carter et al. 2004) and treatment dropout (El Ghoch et al. 2013).

While the importance of exercise in ED populations has been highlighted, a significant limitation within the field is the extensive and varied use of terminology. Terms such as 'excessive exercise', 'exercise addiction', and 'compulsive exercise' (CE) have all been used; with one review paper citing thirty-one different terms describing unhealthy exercise in (Adkins & Keel, 2005). The interchangeable use of terms, both between and within papers, is problematic not only for comparing across studies, but also as individual papers often do not provide operational definitions (Meyer & Taranis, 2011). Among the terms, Adkins & Keel (2005) found there to be 2 major themes; one describing the quantity of exercise undertaken and the other exploring the intrinsic need to exercise. Both perspectives appear consistent with reports from individuals with an ED (Sternheim et al. 2015), however current research supports the idea that it is a pathological compulsion to exercise that is a predictor of ED symptomatology, rather than the frequency or duration of time spent exercising (Adkins & Keel, 2005, Boyd et al. 2007).

Compulsivity, in a clinical context, refers to "an insistent urge to perform a behaviour to relieve the anxiety stemming from fear of perceived negative consequences if the behaviour is not performed" (Meyer et al. 2011,p.181). Within ED populations, an insistent urge to exercise, despite in some cases severe emaciation, has long been recorded as a prominent characteristic (Meyer et al. 2011). DalleGarve et al. (2008) found 46% of ED inpatients (n=165) engaged in CE; with this being most prominent in AN-restricting subtype (80%).

While the presence of CE is gaining a greater awareness, the role it plays within EDs is still unclear. Taranis & Meyer (2003) highlighted the functional similarity between CE and other forms of purging behaviours; both in terms of calorific purgation and affect regulation. The idea that CE may be linked to emotion regulation within ED populations is gaining more support (Goodwin et al. 2012, 2014) and has been included in Meyer et al.'s (2011) empirical model of CE. The model uses a cognitive behavioural framework and details the maintenance cycle of CE. It suggests that CE is maintained through both positive and negative reinforcement; i.e. seeking-out positive emotions that accompany exercise while also exercising as a means of avoiding negative emotions.

1.4 Relationship Between Shame and CE in EDs

As mentioned previously shame is a prominent feature in EDs, however the relationship between exercise and shame in individuals with an ED has received little attention. Findings from two non-clinical studies have suggested a possible link; with results showing individuals that engage in excessive exercise or hold unhelpful social beliefs about exercise to be more likely to self-report higher levels of shame (Meyer et al. 2013; Troop et al. 2006). Similar findings among ED individuals have also been reported. Troop et al. (2006) found bodily shame to be a predictor of excessive exercise in individuals with ED symptoms, and qualitative reports found individuals with AN largely regarded their exercise as "private and shameful" (Clarke, 2013 p.99).

These studies are useful for examining the potential link between exercise and shame, however there are a number of methodological limitations. First, both the study by Meyer and Troop make reference to 'excessive exercise', which describes exercise in terms of frequency and duration. However, current evidence supports CE as the most robust means of assessing unhealthy exercise in EDs (Adkins & Keel, 2005; Boyd et al. 2007; Meyer et al. 2011). Second, the study by Meyer et al. (2013) used a convenience sample of young female exercisers, while Troop et al. (2006) used a combination of non-clinical individuals and those with a self-reported history of an ED. Replication of these findings within a true ED population would therefore be required in order to assess clinical relevance and to determine the exact nature of the relationship between CE and shame.

This study therefore seeks to address the above concerns by examining the relationship between CE and shame in a clinical ED population. Internal, external and bodily shame will all be assessed due to the observed links with ED symptomatology, and the results will be broken down to explore the relationship within different ED pathologies.

2. Aims and Hypotheses

2.1 Aims

The aim of the project is to examine self-reported levels of shame and CE in a clinical ED population.

2.2 Hypotheses

It is hypothesised that there will be a positive relationship between level of CE and shame in individuals with an ED.

3. Plan of Investigation

3.1 Participants

Participants will be recruited from specialised ED services and adult mental health teams. The primary recruitment site will be NHS Lanarkshire's Tertiary Eating Disorder Specialist Service (TESS) and it is hoped that additional teams across health boards will also agree to participate; facilitated by the field supervisors contacts.

3.2 Inclusion and Exclusion Criteria

Participants will be 16 or over and be open to mental health services (either specialised ED or adult mental health) for the treatment of AN, BN, OSFED or BED. Diagnosis will be confirmed by their clinician and be in line with DSM-5 criteria (APA, 2013). It is likely that the majority of participants will be female, however males will not be excluded due to gender. Individuals with a learning disability and those that do not speak English will be excluded due to the demands required to complete self-report measures.

3.3 Recruitment Procedures

The researcher will discuss the purpose and nature of the study with clinicians from all recruitment sites. All eligible individuals open to that service will be sent a recruitment pack containing an information sheet, researcher contact details and the option of either completing the study online; via an attached weblink; or requesting hard copies of the

questionnaires. Upon completion, the researcher will approach the service to gain a confirmation of diagnosis.

3.4 Measures

- Other as Shamer Scale (OASS) (Goss et al. 1994) is an 18-item questionnaire that measures self-evaluation in relation to how others perceive oneself, and will represent a measure of external shame.
- Test of Self-Conscious Affect-Version 3 (TOSCA-3) (Tangney et al. 2000) is an 11-item questionnaire examining shame-proneness, guilt-proneness and externalisation of blame. The questionnaire is scenario-based in which participants are asked to record how they would react in everyday situations. For the purpose of this study only the shame subscale will be analysed and used as a measure of internal shame.
- Bodily Shame Scale (BSS) (Troop et al. 2006) is an 8-item questionnaire that measures clinical features associated with shame relating to the body. It considers both current and anticipated shame, and provides a total score of bodily shame.
- The Compulsive Exercise Test (CET) (Taranis et al. 2011) is a 24-item questionnaire assessing the core clinical features of CE.
- The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) is a 14-item questionnaire assessing clinical features of anxiety and depression.
- A demographic questionnaire including questions relating to ED diagnosis and exercise habits will also be asked.

For a copy of the questionnaires see Appendix U-Z. It is believed this will take approximately 20minutes to complete.

3.5 Design

This study will use a cross-sectional design with individuals completing a series of self-report measures.

3.6 Research Procedures

Individuals will be asked to complete all measures within the questionnaire pack either online or in hard copy. Participants will be recruited on a first come basis and recruitment will continue until the required number has been met. Participants will also be

given the opportunity to contact the researcher to ask additional questions at any point and will be asked to provide informed consent prior to commencement.

3.7 Data Analysis

A correlation analysis will be used to determine whether there is a relationship between self-reported level of shame and CE. Post-hoc correlation analyses will also explore CE in relation to individual facets of shame (internal, external and body) and ED symptomatology (AN, BN, **OSFED,** BED). Results from the HADS will be used to control for symptoms of depression and anxiety.

3.8 Justification of sample size

GPower (v3.1.9.2) (Faul et al. 2009) was used to calculate the required sample size. Using a correlation analysis, it is estimated that in order to detect an effect size of 0.3 with α=0.05, 64 participants will be required; including a mix of ED subtypes. This estimate is based on the findings of Troop et al. (2008) who examined shame in women with a history of ED.

3.9 Settings and Equipment

Participants will be asked to complete the questionnaires in their own home, either online or by post. For researcher equipment please see Appendix BB.

4. Health and Safety Issues

4.1 Researcher Safety Issues

There is minimal risk to the researcher as the study does not involve direct contact with participants. Supervision from the field supervisor will be available throughout the process should any unforeseen issues arise.

4.2 Participant Safety Issues

The questionnaires selected have been used with other ED populations and are therefore not believed to be of significant risk. Should distress arise however, individuals will be advised to contact their named clinician for support.

5. Ethical Issues

Lanarkshire TESS has approximately 50 open cases, and previous research has suggested a response rate of 66% when recruiting individuals with a history of an ED (Troop et al. 2006; 2008; 2012). It will therefore be necessary to gain ethical approval for a multi-site project.

Responses will be anonymous, however each participant will be given a participant number by their service and this will be used to match responses to individuals in order to confirm diagnosis. All information obtained from participants will be kept confidential and in line with NHS data handling policy. It will also be made clear to participants that they do not have to take part in the study and they can disengage at any time without this affecting their care.

6. Financial Issues

For financial costs see CC.

7. Timetable

For proposed timetable see Appendix DD.

8. Practical Applications

Previous research has suggested a possible link between CE and shame in individuals with self-reported ED (Meyer et al. 2013; Troop et al. 2006). The current study will hope to expand on this by examining the relationship within a clinical population and using robust measures of shame and CE. Results will be relevant for developing future interventions, particularly in relation to compassion-focused therapy (Goss & Allan, 2014) and may aid towards the development of a new theoretical model of ED that takes into account CE.

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