A closer look at the relationship between multidimensional perfectionism and multidimensional self-compassion: Structural equation modeling the relationship between *Concern over mistakes*, *Striving for excellence, Discrepancy,* and the six dimensions of self-compassion

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Abstract

Preliminary research suggests that maladaptive perfectionism impedes the development of self-compassion, a self-attitude with numerous biopsychosocial benefits (MacBeth & Gumley, 2012; Neff & Knox, 2017). The precise relationship between these constructs remains unclear, but if accurately modelled could foster an understanding of the barriers that perfectionists experience to being self-compassionate, enabling focused interventions to be developed.

This general population study (N=428) used structural equation modelling to investigate how multidimensional perfectionism related to multidimensional self-compassion. The negative perfectionism dimensions of *Concern over mistakes* and *Discrepancy* significantly predicted lower levels of overall self-compassion and its positive dimensions of *Self-kindness, Common humanity* and *Mindfulness*.

Findings were discussed in relation to the development of population-tailored, dual-focused, interventions aimed at reducing perfectionism and increasing self-compassion.

Keywords: Perfectionism, self-compassion, structural equation modeling, SEM, latent variable modeling

1. Introduction

The established biopsychosocial benefits of self-compassion are considerable (see MacBeth & Gumley, 2012; Neff & Knox, 2017), yet research so far suggests that perfectionists often struggle to develop and maintain such a mindset (Ferrari, Yap, Scott, Einstein, & Ciarrochi, 2018; Hiçdurmaz & Aydin, 2017; Mosewich et al., 2011; Neff, 2003a). A more thorough investigation of the relationship between these constructs is needed to enable researchers to begin to understand what barriers perfectionists face in being self-compassionate, and consequently what psychological tools could be developed and implemented to attempt to break down these barriers. This paper reports on a structural equation modeling approach to investigating this relationship, grounded in existing conceptualizations and understandings of multidimensional perfectionism.

1.1 Multidimensional perfectionism

Perfectionism is a multidimensional personality trait characterized by striving for flawlessness, excessive self-scrutiny, and concern over mistakes (Sirois & Molnar, 2017; Stoeber, 2017). Whilst debate continues over its factor structure, benefits, and costs, it is widely acknowledged that perfectionism varies along a continuum, with people displaying different amounts of overall perfectionism and the characteristics that underpin its various subscales (Gaudreau, Franche, Kljajic, & Martinelli, 2017).

Multidimensional approaches to measuring perfectionism began with Frost, Marten, Lahart, and Rosenblate (1990), who developed a six-factor model differentiating between positive and negative aspects of the construct. The following year, Hewitt and Flett (1991) posited a three-factor model which similarly outlined perfectionism as being multidimensional. However, in comparison to Frost et al. (1990), Hewitt and Flett (1991) contended that all the dimensions they had identified were maladaptive and related to severe psychopathology. Frost, Heimberg,

Holt, Mattia & Neubauer's (1993) subsequent factor analysis of the dimensions yielded by the Frost Multidimensional Perfectionism Scale (F-MPS; Frost et al., 1993) and the Hewitt-Flett Multidimensional Perfectionism Scale (HF-MPS; Hewitt & Flett, 1991) found that two higher-order dimensions, *Positive striving* and *Maladaptive evaluation concerns*, emerged. The two-factor model is now a commonly-used framework within perfectionism research, and whilst the two dimensions have sometimes been conceptualized and defined in slightly different ways, they always remain broadly connotative of positive or negative outcomes. In recent years, the most often-used terminology is that of "perfectionistic strivings" and "perfectionistic concerns" (Stoeber, 2017).

1.2 Perfectionistic strivings (PS) and perfectionistic concerns (PC)

Perfectionistic strivings (PS) is defined by Stoeber and Otto (2006) as a more positive dimension characterized by high personal standards and intrinsically motivated perfectionism. In comparison, *Perfectionistic concerns* (PC) is described as a negative dimension that is focused on concern over mistakes, self-doubt, extrinsically motivated perfectionism and a perceived discrepancy between actual achievements and high expectations (Stoeber & Otto, 2006). Fear of negative social evaluation and negative reactions to imperfection are also characteristic of PC (Gotwals, Stoeber, Dunn, & Stoll, 2012).

PC, or maladaptive perfectionism, has been associated with a multitude of negative outcomes (Hill & Curran, 2015) such as low self-esteem (Moroz & Dunkley, 2015), depression (Békés et al., 2015; Smith, Saklofske, Yan, & Sherry, 2015), obsessive-compulsive disorders (Limburg, Watson, Hagger, & Egan, 2017), anxiety (Smith, Saklofske, & Yan, 2015), avoidant coping strategies (Moroz & Dunkley, 2015) and eating disturbances (Muyan, Chang, Jilani, & Yu, 2015). Furthermore, it has been found to suppress correlations between PS and adaptive characteristics and inflate correlations between PS and maladaptive characteristics (Gotwals et

al., 2012; Hill, Huelsman, & Araujo, 2010) in zero-order correlations between PS and desirable outcomes. Consequently, PC is considered to be solely maladaptive as a construct (Gotwals et al., 2012). In comparison, PS (or adaptive perfectionism) usually leads to comparatively few negative outcomes (Hill & Curran, 2015). It has also been associated with adaptive characteristics such as conscientiousness, problem-focused coping, positive affect (Stoeber, Damian, & Madigan, 2017), satisfaction with life (Smith, Saklofske, & Yan, 2015), better exam performance and the setting of task-approach goals (Stoeber, Haskew, & Scott, 2015).

Nevertheless, it is also important to note that, within clinical populations, all forms of perfectionism have been found to contribute to negative outcomes. For example, Boone and Soenens (2015) found that for individuals high in body dissatisfaction, PS led to increased eating disorder symptomology, with Shafran, Cooper and Fairburn (2002) arguing that individuals within clinical populations may be more likely to exhibit "clinically relevant perfectionism" (p.778), in which they invest their self-worth almost obsessively in a domain that has high personal salience, such as the pursuit of thinness for individuals with some eating disorders. Molnar, Sirois and Method-Jones (2016) further argue that all forms of perfectionism can also be problematic for individuals living with long-term physical conditions. They contend that aspects of living with chronic illness, such as low levels of perceived control, the propensity for negative self-evaluation, and increased reliance on social support, can be particularly problematic for individuals who are high in either dimension of perfectionism, subsequently leading to poorer adjustment to illness and an exacerbation of illness symptoms.

A recent meta-analysis (Smith et al., 2017) further demonstrated that the pernicious effects of all forms of perfectionism are not only to be found within clinical populations; their analysis of 45 studies, encompassing community, psychiatric, and university samples, showed that both PS and PC were significantly related to increased suicidality. Similarly, Limburg, Watson,

Hagger and Egan's (2017) meta-analysis of 284 studies found all forms of perfectionism to be significantly related to psychopathologies such as anxiety disorders, eating disorders, obsessive-compulsive disorders and depression, and Fry and Debats (2009) found that risk of death within their sample of older adults was 51% higher for individuals who were high in PS.

1.3 Perfectionistic strivings (PS), perfectionistic concerns (PC) and self-compassion

Preliminary findings (Ferrari et al., 2018; Hiçdurmaz & Aydin, 2017; Mosewich et al., 2011; Neff, 2003a) consistently suggest that the maladaptive dimension of PC is also negatively related to self-compassion, a mindset characterized by being moved by and open to your own suffering, acknowledging that you are worthy of care and understanding, and treating yourself with the same kind of concern with which you would treat a loved one when they are experiencing difficult circumstances (Brion, Leary, & Drabkin, 2014; Neff, 2003b). In comparison, the relationship between PS and self-compassion is currently more difficult to explicate, as findings to date have been conflicted.

Self-compassion has been associated with a multitude of beneficial attributes, such as greater psychological wellbeing (Keng & Liew, 2016), better mental health (Pinto-Gouveia, Duarte, Matos, & Fráguas, 2014; Trompetter, de Kleine, & Bohlmeijer, 2016), reduced severity of eating psychopathology (Beekman, Stock, & Howe, 2017; Palmeira, Pinto-Gouveia, & Cunha, 2017), adaptive coping strategies (Sirois, Molnar, & Hirsch, 2015), and better physical and psychological adaptation to emotions (Clark et al., 2015). It has also been found to be associated with better adjustment to long-term health conditions (Ferrari, Dal Cin, & Steele, 2017; Sirois & Rowse, 2016; Sirois & Wood, 2016), better physical health (Homan & Sirois, 2017), better practice and self-regulation of health behaviors (Biber & Ellis, 2017; Dowd & Jung, 2017; Sirois, Kitner, & Hirsch, 2015) and a reduction in health risk behaviors (Kelly, Zuroff, Foa, & Gilbert, 2010).

In short, whilst perfectionism has often been found to be associated with undesirable biopsychosocial outcomes, the benefits of self-compassion have been shown to be numerous. Consequently, increasing self-compassion amongst individuals - particularly those high in perfectionism – is a valuable focus that could lead to significant improvements in mental and physical health and wellbeing. The rest of this section will therefore outline the existing literature pertaining to the relationship between perfectionism and self-compassion.

The first study to examine this relationship was Neff (2003a), who found a significant negative correlation between PC, as measured by the "Discrepancy" subscale of the revised Almost-Perfect Scale (APS-R; Slaney, Rice, Mobley, Trippi, & Ashby, 2001), and self-compassion (r = -.57, p <.01). She also found that PS, as measured by the "Standards" subscale of the APS-R, was not significantly related (r = .07, p > .05). More recent research by Ferrari, Yap, Scott, Einstein and Ciarrochi (2018) similarly demonstrated that maladaptive perfectionism, as measured by the 'Socially prescribed perfectionism' subscale of the Child-Adolescent Perfectionism Scale (Flett, Hewitt, Boucher, Davidson, & Munro, 2000) and a combination of subscales from the F-MPS (Frost et al., 1990), was significantly negatively related to self-compassion in their sample of adolescents (r = -.49, p <.001) and adults (r = -.63, p <.001).

However, unpublished conference proceedings by Mosewich et al. (2011) report that both PS and PC, as measured by the Sport Multidimensional Perfectionism Scale 2 (SMPS-2; Gotwals & Dunn, 2009), were negatively related to self-compassion within their sample of college athletes (PS r = -.26; PC r = -.29, p-values not reported). Further research into the relationship between perfectionism and self-compassion within a sample of nursing students (Hiçdurmaz & Aydin, 2017) has also found self-compassion to be negatively related to both PS, as measured by the "Self-oriented perfectionism" subscale of the HF-MPS (Hewitt & Flett, 1991, 2004), and PC, as measured by the "Socially-prescribed perfectionism" subscale of the HF-MPS (PS r = -.18, p <.01); PC r = -.40, p <.01).

As we have so far demonstrated, existing literature on the relationship between the dimensions of perfectionism and self-compassion has been limited, and has yielded mixed results. However, it is promising that all studies to date have found a significant negative relationship between PC and self-compassion, despite using different instruments to measure PC. This triangulation of results suggests that PC's effect on self-compassion is consistent across several different populations, and is not just an artefact of the perfectionism measures used. However, results are conflicted regarding self-compassion's relationship with PS. In this regard, these studies' use of different perfectionism measures makes it difficult to determine how self-compassion is truly related to this dimension of perfectionism.

Another important element that has so far been neglected in the literature is how self-compassion is conceptualized. Neff's (2003a, 2003b) conceptualization of self-compassion consists of three main components: a) *Self-kindness* – being kind and understanding to oneself rather than harsh and critical; b) *Common humanity* – seeing one's experiences as part of the larger human condition (that is, that we are all imperfect and fallible beings); and c) *Mindfulness* – non-judgmental awareness of one's painful thoughts and feelings (Neff, 2003b). Whilst these facets interact with and enhance each other, they are nevertheless conceptually distinct and experienced in phenomenologically unique ways (Neff, 2003b). Consequently, the Self-Compassion Scale (SCS; Neff, 2003a) consists of six factors, representing the three dyads of self-compassion: Self-kindness & self-judgment, common humanity & isolation, and mindfulness & over-identification. However, to date, no previous studies have examined the relationships between the dimensions of perfectionism and each dimension of self-compassion.

Based on the consistently negative relationships found between PC and overall self-compassion to date, it is expected that PC will be negatively related to the three positive self-compassion components (self-kindness, common humanity, and mindfulness) and positively related to the three negative components (self-judgment, isolation, and over-identification). It

is harder to hypothesize how PS will perform, but based on findings so far, it is expected that PS will be unrelated or weakly negatively related to the three positive self-compassion components and unrelated or weakly positively related to the three negative components.

1.4 The current study

The overall aim of this study is to investigate how each dimension of perfectionism is related to 1) Overall self-compassion, and 2) Each dimension of self-compassion.

- **Hypothesis 1a:** PC will be negatively related to Overall self-compassion.
- **Hypothesis 1b:** PS will be weakly – if at all – negatively related to Overall self-compassion.
- **Hypothesis 2a:** PC will be negatively related to the positive self-compassion dimensions of *Self-kindness*, *Common humanity*, and *Mindfulness*; and positively related to the negative self-compassion dimensions of *Self-judgment*, *Isolation*, and *Over-identification.*
- **Hypothesis 2b:** PS will be weakly – if at all – negatively related to the positive self-compassion dimensions of *Self-kindness*, *Common humanity*, and *Mindfulness*; and weakly – if at all – positively related to the negative self-compassion dimensions of *Self-judgment*, *Isolation*, and *Over-identification.*

2. Method

2.1 Participants

Advertisements were placed via the lead researcher's social media accounts and the study was further advertised by the British Psychological Society's press office on their social media pages. Participants were also recruited via emails to several academic mailing lists, primarily aimed at postgraduate students and researchers with interests in health and counselling psychology

488 adults aged between 18 and 72 ($\bar{X}$ age = 34.3 years, *SD* = 12.1 years) volunteered to participate in the cross-sectional online survey. Of the 488 participants, 60 had missing data on all predictor variables and therefore the current analyses are all based on data from 428 participants.

83.2% (n = 406) of the total sample were female, 89.1% (n = 435) indicated that English was their first language, and 87.3% (n = 426) identified as white. Further demographic information is available on request.

2.2 Measures

2.2.1 Perfectionism

Perfectionism was measured using a 30-item scale that resulted from the item and factor analysis of Stoeber and Madigan's (2016) 79-item measure that formed part of the first author's master thesis (Linnett & Kibowski, 2017; see Table 2.1 for factors utilized). The 30-item scale (see Appendix A) measured three distinct factors of perfectionism. The negative dimension (PC) was measured by two factors: *Concern over mistakes*, which taps into the idea of negative reactions to mistakes (Frost et al., 1993; Hill et al., 2004), and *Discrepancy*, which focuses on the person's perception that their high standards are not being met (Hill et al., 2004). The

positive dimension (PS) was measured by one factor, *Striving for excellence*, which focuses on self-directed perfectionistic behaviors that have a motivational aspect (Hewitt & Flett, 1991, 2004; Hill et al., 2004). A summary of the scale development process can be found in Appendix B.

[Insert Table 2.1 here]

Items were presented as a series of statements, with participants indicating on a 5-point Likert scale how strongly they felt that the statement was reflective of their thoughts, feelings or behavior. Items from the *Concern over mistakes* factor included statements such as *"To me, a mistake equals failure"*, whilst items from the *Discrepancy* factor included statements such as *"My performance rarely measures up to my standards"* and items from the *Striving for excellence* factor included statements such as *"I demand nothing less than perfection of myself"*. Categorical McDonald's omega estimates showed excellent levels of reliability for the three factors of *Concern over mistakes* (ω = .94 (95% CI [.93, .95]), *Discrepancy* (ω = .93 (95% CI [.92, .95]) and *Striving for excellence* (ω = .93 (95% CI [.92, .95]). Face validity of the scale was strong, as items clustered into similar factors to those from which the items were originally derived; for instance, the *Concern over mistakes* factor consisted of items derived from the 'Concern over mistakes' factors of the F-MPS (Frost et al., 1990) and the Perfectionism Inventory (PI; Hill et al., 2004) and the *Striving for excellence* factor consisted of items derived from the 'Striving for excellence' and 'Self-oriented perfectionism' factors of the PI and HF-MPS (Hewitt & Flett, 1991, 2004), respectively. The scale was also found to demonstrate adequate convergent and discriminant construct validity.

2.2.2 Self-compassion

Self-compassion was measured using the 26-item Self-Compassion Scale (SCS; Neff, 2003a). The SCS presents participants with a series of statements and asks them to indicate on a 5-point

Likert scale how often (from "Almost never" to "Almost Always") they act that way towards themselves when they are going through a difficult time. The SCS includes statements such as "*I'm intolerant and impatient towards those aspects of my personality I don't like*" and "*I try to see my failings as part of the human condition*". Whilst the SCS consists of six factors (*Self-kindness, Self-judgment, Common humanity, Isolation, Mindfulness*, and *Over-identification)*, Neff (2016) found that at least 90% of the variance in SCS scores can be accounted for by a general factor of self-compassion, arguing that the SCS can therefore be used either to analyze the six subscales of self-compassion or to generate an overall measure. Means for the items from each factor were created (reverse-scoring three of the factors – *Self-judgment*, *Isolation* and *Over-identification*), and a grand mean of all subscale means was then calculated to give an overall measure of self-compassion (e.g. Neff, 2016).

The SCS has demonstrated good internal consistency in past studies, with Neff (2003a) reporting a coefficient α of between .75 and .81 across the six factors. More recently, Neff, Whitaker and Karl (2017) examined the factor structure of the SCS across four distinct populations (college undergraduates, community adults, individuals practicing Buddhist meditation and a clinical sample of individuals with a history of recurrent depression) and found it to be consistent across all four populations, reporting alphas of between .70 and .89 for the six factors and between .91 and .94 for overall self-compassion. The SCS has also demonstrated good convergent and discriminant construct validity (Neff, 2003a; Neff, Kirkpatrick, & Rude, 2007), strong predictive validity (Neff, 2016) and concurrent criterion validity (Neff & McGehee, 2009; Neff, Pisitsungkagarn, & Hsieh, 2008).

2.3 Ethical considerations

All research was carried out in accordance with the British Psychological Society's Code of Ethics and Conduct (2009) and received full ethical approval from Nottingham Trent University's Research Ethics Committee (ref: 16/02/2017).

2.4 Analyses

Descriptive statistics were obtained for all perfectionism and self-compassion factors, and Spearman's Rho correlations were calculated to enable comparison with those from existing literature. Partial correlations were calculated between the more positive dimension of perfectionism and the variables of interest, as research has shown that the extent of the adaptive effects of the more positive perfectionism dimension only becomes apparent once the effects of negative perfectionism have been controlled for (Gotwals et al., 2012; Smith, Saklofske, Yan, et al., 2015; Stoeber & Otto, 2006).

Two structural equation models were specified in Mplus version 8 (Muthén & Muthén, 2011), the first to test the relationship between the dimensions of perfectionism and overall self-compassion, and the second to investigate this relationship further by testing the relationship between the dimensions of perfectionism and the dimensions of self-compassion. All models controlled for age and sex, and were estimated using WLSMV estimation as the indicators for the latent perfectionism factors were categorical. The following indices were used to adjudge model fit:

*Chi-square***.** A "good" fit is expected to provide a non-significant χ^2 statistic at the 0.05 threshold (Barrett, 2007). However, it is generally acknowledged that in sample sizes greater than ~200, chi-square values are inflated, meaning the statistic almost always rejects the model when large samples are used (e.g. Hooper, Coughlan, & Mullen, 2008). As there were data from 428 participants in the dataset, it is therefore likely that the chi-square statistic would be inflated for this model.

Comparative fit indices. Hu and Bentler (1999) recommend a cut-off of ≥ 95 for the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI). However, results of other studies do not necessarily support this threshold (Kline, 2011; Yuan, 2005), and thresholds of .90 for both the CFI and TLI are often cited in the literature as indicating "adequate" fit (e.g. Byrne, 1995; Hooper et al., 2008).

Root mean square error of approximation (RMSEA). The RMSEA is termed a "badness-of-fit" index, in that a value of zero represents the best fit. Hu and Bentler (1999) recommend that the cut-off value of the RMSEA should be close to .06, and that values lower than .03 represent excellent fit. They also advise that the upper confidence interval of the RMSEA should be <.08. However, it should be noted that some have argued against universal cut-off points for the RMSEA, contending that these cannot be supported and that the RMSEA should therefore not be pursued in isolation from other indices of model fit (Chen, Carolina, Curran, Bollen, & Kirby, 2009).

Weighted root mean square residual (WRMR). The WRMR is reported here instead of the standardized root mean square residual (SRMR) as the appropriate fit statistic for WLSMV estimation. Yu (2002) advises that with cut-off values <0.95 or 1.0, the WRMR has moderate or strong power to detect model fit. However, the utility of the WRMR has been called into question by other researchers, who argue that it is an experimental fit statistic and should be ignored (see comments by Muthén, 2014).

3. Results

3.1 Descriptive statistics

Scores for all three perfectionism dimensions were normally distributed, as were scores for the self-compassion factors of *Self-kindness, Common humanity* and *Mindfulness* (see Table 3.1). However, scores for *Self-judgment, Isolation* and *Over-identification* were significantly negatively skewed, and scores for *Overall self-compassion* were significantly positively skewed, as they all had *z*-scores >2.58 (Field, 2012). Furthermore, all the perfectionism dimensions and the self-compassion dimension of *Common humanity* were significantly platykurtic (z >2.58).

[Insert Table 3.1 here]

Spearman's Rho correlations were then calculated between *Concern over mistakes, Discrepancy*, age, and all dimensions of self-compassion (see Table 3.2). Partial correlations between *Striving for excellence*, age and all dimensions were also calculated, controlling for *Concern over mistakes* and *Discrepancy* due to the suppressing effects of the negative dimensions of perfectionism (see section 2.4).

[Insert Table 3.2 here]

3.2 Model 1: Multidimensional perfectionism on overall self-compassion

A structural equation model was tested of how the latent variables *Concern over mistakes*, *Striving for excellence*, and *Discrepancy* related to the observed variable *Mean self-compassion.* Participant *Age* and *Sex* were controlled for. As expected, the chi-square test was highly significant ($\chi^2(489, n = 428) = 1063.01$, p <.001). However, all other fit indices apart from the WRMR indicated good model fit (see Table 3.3) and the model accounted for 60% of

the variance in the self-compassion score (r^2 = .60, p <.001). *Age* was found to significantly predict higher self-compassion scores (β = .19, p <.001) but *Sex* was not (β = .05, p = 0.33).

[Insert Table 3.3 here]

Figure 1 presents the standardized factor loadings and parameter estimates for the paths of Model 1. The Perfectionistic Concerns (PC) dimensions of *Concern over mistakes* and *Discrepancy* were found to significantly predict lower levels of mean self-compassion at p <.001 (β = -.45 and β = -.34 respectively) – providing support for Hypothesis 1a – whilst the Perfectionistic Strivings (PS) dimension of *Striving for Excellence* was not (β = -.02, p = 0.71) – providing support for Hypothesis 2a.

[Insert Figure 1 here]

3.3 Model 2: Multidimensional perfectionism on multidimensional self-compassion

A second structural equation model was then tested of how the latent variables *Concern over mistakes*, *Striving for excellence*, and *Discrepancy* related to the observed self-compassion variables of *Self-kindness, Self-judgment, Common humanity, Isolation, Mindfulness* and *Over-identification* with a hierarchical latent variable of *Overall perfectionism.* Participant *Age* and *Sex* were controlled for. As expected, the chi-square test was highly significant (χ^2(624, n = 428) = 1258.320, p <.001). However, all other fit indices apart from the WRMR indicated good model fit (see Table 3.3).

Figure 2 presents the standardized factor loadings and parameter estimates for the statistically significant paths of the final structural equation model, with the measurement models for CM, SE and D omitted. *Concern over mistakes* was the strongest indicator for *Overall perfectionism* (β = .92, p <.001), followed by *Striving for excellence* (β = .73, p <.001) and *Discrepancy* (β = .86, p <.001). The PC dimensions of *Concern over mistakes* and *Discrepancy* significantly

predicted lower levels of the positive self-compassion dimensions of *Self-kindness* (CM β = -.37, p <.001; D β = -.32, p <.001), *Common humanity* (CM β = -.41, p <.001; D β = -.15, p <.001) and *Mindfulness* (CM β = -.46, p <.001; D β = -.17, p <.01) – providing support for Hypothesis 1a – and higher levels of *Self-judgment* (CM β = .35, p <.001; D β = .32, p <.001), *Isolation* (CM β = .31, p <.001; D β = .39, p <.001) and *Over-identification* (CM β = .41, p <.001; D β = .23, p <.001) – providing support for Hypothesis 1b. The PS dimension of *Striving for excellence* was found to only predict higher levels of the negative self-compassion dimension of *Self-judgment,* but weakly (β = .13, p <.01), and to be not significantly related to any of the other dimensions of self-compassion, thus providing support for Hypothesis 2b.

[Insert Figure 2 here]

4. Discussion

The aim of this paper was to use structural equation modelling (SEM) to investigate how the dimensions of perfectionism differentially relate to self-compassion, both as an overall concept and as a six-dimensional construct.

Model testing found **Hypothesis 1a** to be supported, in that the negative perfectionism dimensions of *Concern over mistakes* (CM) and *Discrepancy* (D) were significant predictors of lower levels of overall self-compassion. Furthermore, **Hypothesis 1b** was also supported, as the more positive perfectionism dimension of *Striving for excellence* (SE) was found to have a non-significant relationship with overall self-compassion. In accordance with **Hypothesis 2a**, CM and D were significant predictors of lower levels of the positive self-compassion dimensions of *Self-kindness, Common humanity* and *Mindfulness* and higher levels of the negative self-compassion dimensions of *Self-judgment, Isolation* and *Over-identification*. **Hypothesis 2b** was also supported, as SE was found to have a non-significant relationship with all but one of the self-compassion dimensions, where interestingly, SE was found to have a weak but statistically significant relationship with *Self-judgment*. This suggests that SE does still contribute to lower self-compassion via an increase in self-judgmental thoughts, feelings and behaviors.

These findings replicate the work of Neff (2003a), finding, as she did, a negative relationship between the maladaptive dimension of perfectionism and overall self-compassion and a non-significant relationship between the more adaptive dimension of perfectionism and overall self-compassion. Similarly, these findings replicate those of Ferrari et al. (2018), who also found a negative relationship between the maladaptive dimension of perfectionism and overall self-compassion (but did not assess the role of the more adaptive dimension of perfectionism). The results of this study also partially replicate those of Mosewich et al. (2011) and Hiçdurmaz &

Aydin (2017), although both of these studies found a significant negative relationship between both the maladaptive and more adaptive dimensions of perfectionism and self-compassion, whereas the present study only found a negative relationship between the more adaptive dimension of perfectionism and the *Self-judgment* dimension of self-compassion.

By considering self-compassion multidimensionally, this study has made a novel contribution by demonstrating that the negative perfectionism dimensions of CM and D differentially have a significant detrimental effect on an individual's ability to be self-compassionate, with CM predicting lower levels of self-compassion than D. Furthermore, even the more positive perfectionism dimension of SE has been shown to lead to increased levels of self-judgement. In short, people high in perfectionism are more likely to have lower levels of self-kindness, feelings of common humanity and mindfulness, and higher levels of self-judgment, isolation and over-identification with negative thoughts and feelings.

4.1 Practical applications

Recent studies such as those by Rozental et al. (2018) have demonstrated that internet-based cognitive behavioral therapy (I-CBT) is effective in reducing perfectionism, demonstrating significantly lower scores on the F-MPS' 'Concern over mistakes' subscale between pre-treatment and follow-up as well as reduced levels of depression and anxiety. Furthermore, at 6-12-month follow-up they found that 59% of participants in one sample and 43% in another met the criteria for recovery, and that participants showed similar levels of perfectionism, depression and anxiety as they had post-treatment, suggesting that I-CBT is also effective in maintaining improvements made during treatment. The findings of the present study, which showed that both 'Concern over mistakes' and 'Discrepancy' were strong indicators of overall hierarchical perfectionism, suggest that whilst the 'Discrepancy' dimension of perfectionism was not assessed by Rozental et al. (2018), this could also be expected to decrease as a result

of interventions targeting perfectionism. In turn, this study's findings that the 'Concern over mistakes' and 'Discrepancy' dimensions of perfectionism are negatively associated with self-compassion indicate that self-compassion could therefore be expected to increase as a result of lowered levels of these aspects of perfectionism. Lloyd, Schmidt, Khondoker and Tchanturia's (2015) systematic review and meta-analysis of psychological interventions to reduce perfectionism also found evidence that a variety of cognitive-behavioral interventions (individual, guided self-help, web-based and group) were able to significantly reduce aspects of perfectionism as well as anxiety, depression, obsessive-compulsive behavior and eating disorder symptomology.

Similarly, whilst self-compassion is considered to be a relatively stable personality trait (e.g. Clark et al., 2015; Keng & Liew, 2016), it is also possible for it to be induced through interventions such as the Mindful Self-Compassion Program (MSCP; Neff & Germer, 2013). The MSCP is designed for the general public as well as clinical populations, aiming to increase self-compassion through exercises such as visualization, self-kindness in language, and engaging in self-compassionate behaviors and habits (Neff & Germer, 2013). Neff and Germer (2013) reported a significant increase in self-compassion ($d = 1.34$) and mindfulness ($d = 0.52$) in participants who had taken part in the MSCP over the course of 8 weeks (effect size calculations from Kirby, Tellegen, & Steindl, 2017). Furthermore, a recent meta-analysis of compassion-based randomized controlled trials (nearly half of which involved interventions specifically targeted at increasing self-compassion) found an overall significant difference in participants' self-compassion ($d = 0.70$, k = 13, n = 980) and mindfulness ($d = 0.54$, k = 6, n = 335) as a result of taking part in the intervention (Kirby et al., 2017). Consequently, it may be reasonable to assume that, over time, self-compassionate states achieved through such interventions could be transformed into more effortless traits, in much the same way as has been found to be possible for mindfulness (Davis & Hayes, 2011).

These findings demonstrate how effective interventions aimed at targeting perfectionism or self-compassion can be, but to date there have been no interventions formulated that aim to both increase self-compassion and decrease perfectionism. The findings of this study make explicit how perfectionism erodes self-kindness, a sense of common humanity, and mindfulness whilst increasing self-judgment, isolation, and over-identification with painful emotions. The formulation of a dual-focus intervention that addresses perfectionistic thoughts, feelings, and behaviors whilst fostering an increasingly self-compassionate mindset could therefore be particularly beneficial to individuals, especially within clinical populations and applied health settings. For example, within diabetic populations, one study has so far demonstrated that Mindful Self-Compassion training can reduce diabetes distress and increase glycemic control amongst people with Type 1 and Type 2 diabetes (Friis, Johnson, Cutfield, & Consedine, 2016). It has also been posited that increased self-compassion could contribute to higher levels of self-care and health-promoting behaviours amongst diabetic individuals (Friis, Consedine, & Johnson, 2015). These findings are important, as evidence suggests that individuals with some chronic illnesses report lower levels of self-compassion and higher levels of shame and self-blame (Harrison et al., 2015; Harrison, Robertson, Goldstein, & Brooks, 2017), but so far interventions have only focused on increasing self-compassion rather than concurrently aiming to reduce perfectionism.

4.2 Creating tailored interventions

A dual-focus intervention that addresses all areas of multidimensional perfectionism and multidimensional self-compassion could be an effective tool across many varied populations. However, the findings of the present study, conducted within a general population sample, suggest that for this population, perfectionism's greatest impact is via CM, leading to lower levels of mindfulness (β = -.46, p <.001) and common humanity (β = -.41, p <.001) and higher levels of over-identification with painful thoughts and feelings (β = .41, p <.001). Interventions

developed for this population could therefore be focused on reducing CM whilst at the same time aiming to increase mindfulness and feelings of common humanity, and aiming to reduce over-identification with difficult emotions.

Consequently, if the relationship between self-compassion and perfectionism were to be explored within specific clinical populations, it would also be theoretically possible to develop targeted interventions that address the unique needs of that patient group. For example, within diabetes populations, perfectionists can struggle with the idea that they will never be able to achieve "metabolic perfection" (Basco, 1998) – i.e. complete control over their blood glucose levels – and can therefore give up on attempts to manage their condition altogether because they feel that they have "failed". Building on the findings of this study and the models presented, it could be possible to elucidate the relationship between multidimensional perfectionism and multidimensional self-compassion within samples of people with diabetes and accurately model the effect this has on health outcomes. This would facilitate a thorough investigation of the barriers to self-compassion experienced by people with diabetes, which would then potentially enable interventions to be developed that aimed to reduce these specific barriers, potentially leading to an improvement in health outcomes.

Whilst this is only one example, the specific difficulties encountered by individuals living with chronic physical or psychological health problems are varied, and the use of the present study's model could enable a flexible and responsive intervention to be developed that could be adapted to meet the specific needs of a number of populations.

4.2. Strengths, limitations, and future research directions

Whilst the findings of this study are indicative of multidimensional perfectionism being an important factor in the development of multidimensional self-compassion, it should be noted that a large proportion of the sample were white (87.3%) and female (83.2%). This may partly

be due to the primary method of recruitment, as Topolovec-Vranic and Natarajan (2016) found that samples recruited via social media are more likely to be female. In addition to the intervention recommendations already outlined, future work should seek to investigate the differential relationship of the perfectionism factors to those of self-compassion within a more heterogeneous sample.

As Cohen (1965, as cited in Howell, 2013) notes, "in psychology, we measure men by their shadows" (p.8). SEM is well-placed to enable the measurement of these "shadows", allowing variables that cannot be directly observed, such as perfectionism and self-compassion, to be estimated using measurement models comprised of numerous observed variables or indicators. The SEM approach used in this study is therefore advantageous as it allows simultaneous analysis of the relationships between multiple variables and ensures that measurement error is not aggregated in a residual error term for the latent variables created (Nachtigall, Kroehne, Funke, & Steyer, 2003). However, the use of SEM techniques to predict changes in outcome variables cannot confirm or deny a causal relationship. It would therefore be beneficial to employ longitudinal methods over a number of time-points to ascertain whether there is a causal relationship between perfectionism and self-compassion in much the same way as has been possible for perfectionism and depressive symptoms (Soenens et al., 2008) or for self-compassion and self-esteem (Marshall et al., 2015).

4.3 Conclusion

Despite the limitations outlined, all of the hypotheses of the study were fully supported, and the models tested demonstrated that, within this general population sample, both negative dimensions of perfectionism have a significant negative impact on overall self-compassion and its positive components, simultaneously increasing levels of the negative dimensions of self-

compassion. Furthermore, even the more positive dimension of perfectionism has been found to raise levels of self-judgment amongst this sample.

These findings have the potential to significantly impact individual and therapeutic approaches to physical and psychological health and wellbeing, as they demonstrate how detrimental the negative dimensions of perfectionism can be to the development and maintenance of self-compassion, and how the *Concern over mistakes* dimension is generally more problematic in this regard than *Discrepancy*. Furthermore, the findings show that even the dimension of perfectionism that is considered more positive can still lead to negative outcomes, as demonstrated by the relationship between *Striving for excellence* and higher levels of *Self-judgment*. This knowledge can be used within existing cognitive-behavioral and psychotherapeutic frameworks to develop interventions that target these aspects of perfectionistic thinking and behavior as a way of reducing an individual's mental barriers to the psychologically and physiologically beneficial practice of developing and maintaining a self-compassionate mindset.

In conclusion, this study has extended current knowledge of how high levels of some forms of perfectionism can have a significant detrimental effect on the development and maintenance of a self-compassionate mindset, generating fresh understandings which have the potential to positively influence approaches to biopsychosocial wellbeing.

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TABLES

Table 2.1: Scales capturing perfectionistic strivings and perfectionistic concerns

Table 2.1

Scales capturing perfectionistic strivings and perfectionistic concerns

		Subscales recommended as indicators of…	
Measures	Reference	Perfectionistic strivings	Perfectionistic concerns
F-MPS	Frost et al. (1990)	Personal standards	Concern over mistakes
HF-MPS	Hewitt & Flett (1991; 2004)	Self-oriented perfectionism	Socially prescribed perfectionism
APS-R	Slaney et al. (2001)	High standards	Discrepancy
PI	Hill et al. (2004)	Striving for excellence	Concern over mistakes

Note. Table is a partial reproduction of that found in Stoeber and Madigan (2016), p.33.

Table 3.1: Descriptive statistics for perfectionism and self-compassion scores

Table 3.1

Descriptive statistics for perfectionism and self-compassion scores

			Skew			Kurtosis		
	M	*SD*	Statistic	*SE*	*z*	Statistic	*SE*	*z*
Concern over mistakes	3.05	.04	0.06	0.11	0.50	-0.89	0.22	-3.98*
Striving for excellence	3.10	.04	0.08	0.11	0.72	-0.65	0.22	-2.91*
Discrepancy	3.22	.04	-0.11	0.11	-0.97	-0.89	0.22	-3.99*
Overall self-compassion	2.62	.04	0.59	0.11	5.22*	-0.26	0.22	-1.17
Self-kindness	2.73	.04	0.25	0.11	2.20	-0.37	0.22	-1.64
Self-judgement	3.64	.04	-0.58	0.11	-5.21*	-0.14	0.22	-0.61
Common humanity	2.91	.05	0.14	0.11	1.23	-0.73	0.22	-3.29*
Isolation	3.54	.05	-0.54	0.11	-4.79*	-0.40	0.22	-1.79
Mindfulness	3.14	.04	0.01	0.11	0.13	-0.52	0.22	-2.31
Over-identification	3.69	.04	-0.69	0.11	-6.17*	-0.09	0.22	-0.39

* Significant at p <.01

Table 3.2: Correlations between perfectionism, self-compassion, and age

Table 3.2

Correlations between perfectionism, self-compassion, and age

	1	2	3	4	5	6	7	8	9	10	11
1. Overall self-compassion	-										
2. Self-kindness	.84***	-									
3. Self-judgment	-.85***	-.73***	-								
4. Common humanity	.78***	.66***	-.54***	-							
5. Isolation	-.79***	-.54***	.67***	-.54***	-						
6. Mindfulness	.80***	.69***	-.56***	.67***	-.47***	-					
7. Over-identification	-.77***	-.50***	.67***	-.45***	.66***	-.55***	-				
8. Concern over mistakes	-.73***	-.60***	.69***	-.52***	.57***	-.54***	.59***	-			
9. Discrepancy	-.68***	-.58***	.65***	-.47***	.57***	-.48***	.54***	.71***	-		
10. Striving for excellence	-.08[a]	-.05[a]	.17***[a]	-.02[a]	.03[a]	.01[a]	.07[a]	.60***	.71***	-	
11. Age	.12*	.10*	-.09	.12*	-.06	.10	-.12*	-.03	-.10	-.05	-

[a] Controlling for *Concern over mistakes* and *Discrepancy*

* Significant at $p < .05$ *** Significant at $p < .001$

Table 3.3: Model fit indices

Table 3.3
Model fit indices

				90% CIs for RMSEA		
	CFI	TLI	RMSEA	Lower	Upper	WRMR
Model 1: Multidimensional perfectionism on overall self-compassion	0.97	0.97	0.05	0.05	0.06	1.25
Model 2: Multidimensional perfectionism on multidimensional self-compassion	0.97	0.96	0.05	0.05	0.05	1.13

FIGURES

Figure 1: Model diagram with standardized regression paths for Model 1

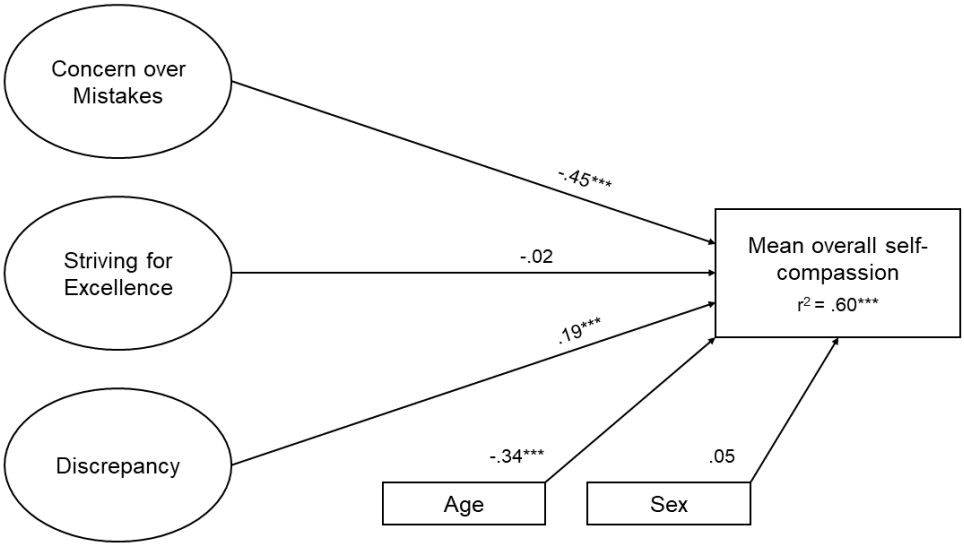

Fig. 1. Standardized regression paths for Model 1, relating the 3-factor model of perfectionism to overall self-compassion.
Note: Correlations between all perfectionism factors were significant at p <.001.

Key: *** denotes significance at p <.001

Figure 2: Model diagram with standardized regression paths for Model 2

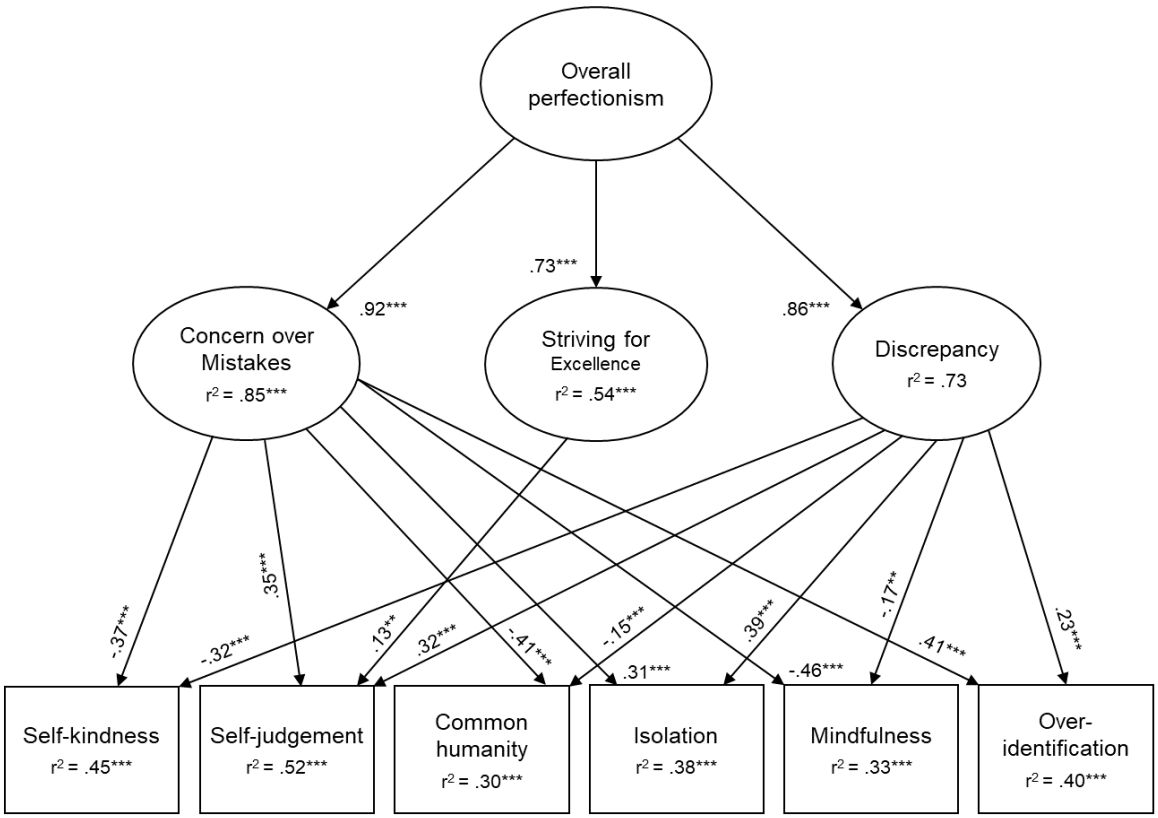

Fig. 2. Standardized estimates for Model 2, relating the hierarchical 3-factor model of perfectionism to the six factors of self-compassion.
Note: (i) The measurement models for CM, SE and D have been omitted; (ii) Age and Sex were controlled for in the regression paths; (iii) Correlations between all self-compassion factors were significant at p <.01.

Key: *** denotes significance at p <.001, ** denotes significance at p <.01