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Examining Mutual Suppression Effects in the Assessment of Perfectionism Cognitions:
Evidence Supporting Multidimensional Assessment

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Abstract

Perfectionism cognitions capture automatic perfectionistic thoughts and have explained variance in psychological adjustment and maladjustment beyond trait perfectionism. The aim of the present research was to investigate whether a multidimensional assessment of perfectionism cognitions has advantages over a unidimensional assessment. To this aim, we examined in a sample of 324 university students how the Perfectionism Cognitions Inventory (PCI) and the Multidimensional Perfectionism Cognitions Inventory (MPCI) explained variance in positive affect, negative affect, and depressive symptoms when factor or subscale scores were used as predictors compared to total scores. Results showed that a multidimensional assessment (PCI factor scores, MPCI subscale scores) explained more variance than a unidimensional assessment (PCI and MPCI total scores) because, when the different dimensions were entered simultaneously as predictors, perfectionistic strivings cognitions and perfectionistic concerns cognitions acted as mutual suppressors thereby increasing each others' predictive validity. With this, the present findings provide evidence that—regardless of whether the PCI or the MPCI is used—a multidimensional assessment of perfectionism cognitions has advantages over a unidimensional assessment in explaining variance in psychological adjustment and maladjustment.

Keywords: perfectionistic strivings; perfectionistic concerns; automatic thoughts; positive and negative affect; depressive symptoms; suppression

Examining Mutual Suppression Effects in the Assessment of Perfectionism Cognitions:
Evidence Supporting Multidimensional Assessment

Perfectionism is a personality trait characterized by striving for flawlessness and setting exceedingly high standards of performance accompanied by overly critical evaluations of one's behavior (Flett & Hewitt, 2002; Frost, Marten, Lahart, & Rosenblate, 1990). Over the past 20 years, research has produced converging evidence that perfectionism has different aspects and is best conceptualized as a multidimensional characteristic (Enns & Cox, 2002; Lo & Abbott, 2013b). In particular, two main dimensions have been differentiated: *perfectionistic strivings* (also called personal standards perfectionism) comprising perfectionist personal standards and a self-oriented striving for perfection, and *perfectionistic concerns* (also called evaluative concerns perfectionism) comprising concerns about making mistakes, feelings of discrepancy between one's standards and performance, and fears of negative evaluation and rejection by others if one fails to be perfect (see Stoeber & Otto, 2006, for a review).

The differentiation between the two dimensions is of central importance to the understanding of trait perfectionism because the two dimensions often show different, sometimes opposite, patterns of relationships with psychological adjustment and maladjustment. These differential patterns, however, may become evident only when perfectionistic strivings and perfectionistic concerns are regarded simultaneously as predictors resulting in a "suppressor situation" (Paulhus, Robins, Trzesniewski, & Tracy, 2004) in which the two dimensions mutually suppress irrelevant variance in the prediction of adjustment and maladjustment thereby enhancing their differential relationships (R. W. Hill, Huelsman, & Araujo, 2010). In this situation, perfectionistic strivings typically show positive relationships with indicators of psychological adjustment (e.g., positive affect, satisfaction with life) and negative relationships with indicators of psychological maladjustment (e.g., negative affect, depressive symptoms) whereas

perfectionistic concerns typically show positive relationships with indicators of psychological maladjustment or negative relationships with indicators of psychological adjustment (R. W. Hill et al., 2010; Stoeber & Otto, 2006; see also Gotwals, Stoeber, Dunn, & Stoll, 2012; A. P. Hill, in press).

The main aim of the present study was to investigate whether similar suppressor situations are evident when perfectionism cognitions instead of trait perfectionism are assessed. In this, however, one problem we encountered was that the established instrument for the assessment of perfectionism cognitions—the Perfectionism Cognitions Inventory (PCI; Flett, Hewitt, Blankstein, & Gray, 1998)—is conceptualized as a one-dimensional measure capturing perfectionism cognitions in a total score despite factor analyses suggesting that the PCI is multidimensional. In contrast, a more recently developed instrument—the Multidimensional Perfectionism Cognitions Inventory (MPCI; Kobori & Tanno, 2004)—is conceptualized as a multidimensional measure capturing three dimensions of perfectionism cognitions: personal standards, pursuit of perfection, and concern over mistakes. However, research on the MPCI is very limited. So far only one study has examined the MPCI in an English-speaking sample (Stoeber, Kobori, & Tanno, 2010), and the incremental validity of the MPCI when compared to the PCI still remains to be established. Consequently, a secondary aim of the present study was to re-examine the dimensionality of the PCI. Moreover, we aimed to provide a further examination of the MPCI in direct comparison with the PCI focusing on the MPCI's incremental validity with respect to the prediction of three key indicators of psychological adjustment and maladjustment: positive affect, negative affect, and depressive symptoms.

Perfectionism Cognitions

Perfectionism cognitions are automatic perfectionistic thoughts reflecting the need to be perfect and concerns about one's inability to achieve perfection (Flett et al., 1998). Perfectionism

cognitions are an important addition to research on perfectionism as they have explained variance in indicators of psychological maladjustment beyond trait perfectionism (e.g., depressive symptoms; Flett et al., 1998; Flett et al., 2012; Flett, Hewitt, Whelan, & Martin, 2007). Moreover, the two approaches—trait perfectionism and perfectionism cognitions—take different perspectives on perfectionism and its assessment (see Fleeson, 2012, for a review of the different perspectives). The trait perspective focuses on the characteristic style or manner in which perfectionists think, feel, and behave. Consequently, self-report instruments assessing trait perfectionism present participants with a list of statements describing beliefs, feelings, and behaviors that are characteristic of perfectionists, and participants indicate the degree to which they agree with these statements (Frost et al., 1990; Hewitt & Flett, 1991; Slaney, Rice, Mobley, Trippi, & Ashby, 2001). In comparison, the cognitive perspective on perfectionism focuses on the way perfectionists think, what thoughts they have, and how frequently they have these thoughts. Accordingly, the PCI's instructions presents statements that are described as “a variety of thoughts about perfectionism that sometimes pop into people's head” (p. 1365), and participants are asked to indicate how often each thought occurred over the past week. Accordingly, the PCI taps perfectionism as the frequency of “personality states” rather than as a personality trait (see again Fleeson, 2012).

The Perfectionism Cognitions Inventory (PCI)

Development and validation. In line with the cognitive perspective, the PCI was developed based on the idea that perfectionists are characterized by frequent cognitions about perfection (Flett et al., 1998). These cognitions represent automatic thoughts reflecting a combination of excessively high standards, a need to be perfect, and concerns about the inability to achieve perfection. Based on the available literature, their experience with perfectionists, and their understanding of the perfectionism construct, Flett and colleagues (1998) generated an initial

pool of 55 items that, after deleting duplicates and items with extremely high or low response averages, was reduced to the 25 items representing the final version of the PCI (see Table 1).

The PCI is a widely-used measure that has shown reliability and validity in numerous studies and has made significant contributions to our understanding of the correlates and consequences of perfectionistic thinking (e.g., Bardone-Cone, Sturm, Lawson, Robinson, & Smith, 2010; Besser, Flett, Hewitt, & Guez, 2008; Burns, Lee, & Brown, 2011; Flett et al., 1998; Flett et al., 2012; Flett et al., 2007; Flett, Newby, Hewitt, & Persaud, 2011; A. P. Hill & Appleton, 2011; Lo & Abbott, 2013a; Pulford, Johnson, & Awaida, 2005; Rudolph, Flett, & Hewitt, 2007; Wimberley & Stasio, 2013). Regarding reliability, PCI total scores—obtained by summing participants' responses across all 25 items—have shown Cronbach's alphas $> .90$ across studies (e.g., Flett et al., 1998; Flett et al., 2012; Flett et al., 2007). Regarding construct validity, the PCI total scores have showed large-sized¹ positive correlations with measures of trait perfectionism and measures of negative automatic thoughts (e.g., Flett et al., 1998, Flett et al., 2012; Flett et al., 2007). Furthermore, PCI scores have shown medium-sized positive correlations with key indicators of psychological maladjustment such as negative affect and depressive symptoms (e.g., Flett et al., 1998; Flett et al., 2007). Moreover and more importantly, PCI scores have explained variance in depressive symptoms, anxiety symptoms, bulimic thoughts, and athlete burnout over and above variance explained by trait perfectionism (Flett et al., 1998; Flett et al., 2007; Flett et al., 2012; Flett et al., 2011; A. P. Hill & Appleton, 2011) attesting that the PCI scores show incremental validity over measures of trait perfectionism and confirming that the concept of perfectionism cognitions is an important and useful addition to the perfectionism

¹Following Cohen (1992), correlations with absolute values of .10, .30, and .50 were considered small-, medium-, and large-sized.

literature.

Open questions. However, there are open questions regarding the PCI's dimensionality. Flett and colleagues (1998, 2007, 2012) assert that the PCI is one-dimensional. However, there are indications that the PCI may be multidimensional, not one-dimensional. First, Flett and colleagues (1998) generated the PCI items on the basis of the available literature, their experience in counseling perfectionists, and their understanding of the perfectionism construct. All this, however, would suggest that the PCI is multidimensional, following the majority of the perfectionism literature of the past 20 years indicating that perfectionism is best conceptualized as a multidimensional construct (Enns & Cox, 2002; see also Hewitt, Flett, Besser, Sherry, & McGee, 2003). Second, an inspection of the PCI's items (see again Table 1) shows that some items are near-identical to items from measures of trait perfectionism that are multidimensional. For example, Item 13 ("My goals are very high") and Item 23 ("I certainly have high standards") are near-identical to items of Frost's Multidimensional Perfectionism Subscale (MPS) subscale capturing personal standards (Frost et al., 1990) and items of Hewitt and Flett's MPS subscale capturing self-oriented perfectionism (Hewitt & Flett, 1991). Both personal standards and self-oriented perfectionism are defining aspects of the perfectionistic strivings dimension of perfectionism (Stoeber & Otto, 2006). Other items such as Item 11 ("People expect me to be perfect") and Item 10 ("No matter how much I do, it's never enough") are near-identical to items of Hewitt and Flett's MPS subscale capturing socially prescribed perfectionism (Hewitt & Flett, 1991) and the Almost Perfect Subscale-Revised subscale capturing perfectionistic discrepancies (Slaney et al., 2001). Both socially prescribed perfectionism and perfectionistic discrepancies are defining aspects of the perfectionistic concerns dimension of perfectionism (Stoeber & Otto, 2006). Consequently the PCI appears to contain items capturing perfectionism cognitions reflecting the two main dimensions of perfectionism: perfectionistic strivings and perfectionistic

concerns.

Finally, Flett and colleagues (1998) assert that the PCI is unidimensional based on results from two principal components analyses conducted on different samples during the PCI's development (see Flett et al., 1998, for details). However, if we have another look at the analyses and compare the eigenvalues they found to random eigenvalues using parallel analysis (Horn, 1965; see Zwick & Velicer, 1986), the one-dimensionality of the PCI appears questionable. The first principal components analysis Flett and colleagues (1998) conducted was based on responses from 234 students and found a large first component with an eigenvalue of 12.83 (explaining 51.3% of variance) and two smaller components with eigenvalues of 1.65 and 1.25 (explaining 6.6% and 5.0% of variance). If we take RanEigen (Enzmann, 1997), compute random eigenvalues for 25 items with $N = 234$, and compare the three eigenvalues Flett and colleagues reported to the random eigenvalues, the first two eigenvalues are larger than the random eigenvalues suggesting that the PCI is two-factorial. The second principal components analysis Flett and colleagues (1998) conducted was based on responses from 747 students and found a large first component with an eigenvalue of 9.39 (explaining 37.6% of variance) and three smaller components with eigenvalues of 1.75, 1.48, and 1.23 (explaining 7.0%, 5.9%, and 4.9% of variance). If we compute random eigenvalues for 25 items with $N = 747$ and compare the four eigenvalues Flett and colleagues reported to the random eigenvalues, the first three eigenvalues are larger than the random eigenvalues suggesting that the PCI is three-factorial.

A further principal components analysis on the PCI was conducted on responses from a sample of 250 adolescents (Flett et al., 2012) and found four eigenvalues > 1 . Unfortunately, Flett and colleagues reported only the eigenvalues of the first two components, namely 9.12 and 1.70 (explaining 36.5% and 6.8% of variance). If we compute random eigenvalues for 25 items with $N = 250$, both eigenvalues are larger than the corresponding random eigenvalues suggesting that the

PCI is at least two-factorial.

The Multidimensional Perfectionism Cognitions Inventory (MPCI)

Development and validation. Unlike the PCI, the MPCI (Kobori & Tanno, 2004) was conceptualized as a multidimensional measure. Whereas the MPCI was inspired by the PCI and uses the same instructions and time frame (“past week”) as the PCI, Kobori and Tanno set out to develop a multidimensional measure that captured positive and negative perfectionism cognitions (see Stoeber et al., 2010, for details). The resulting 15-item inventory was called the Multidimensional Perfectionism Cognitions Inventory (MPCI) and comprised three subscales: Personal Standards capturing cognitions about having perfectionistic standards (5 items; e.g., “It’s important to set high standards for myself”), Pursuit of Perfection capturing cognitions about the need to be perfect (5 items; e.g., “I must be perfect at any cost”), and Concern over Mistakes capturing cognitions about mistakes (5 items; e.g., “I’ll blame myself if I make a mistake”).²

The MPCI has shown reliability and validity in a limited number of studies (Kobori & Tanno, 2004, 2005; Kobori, Yoshie, Kudo, & Ohtsuki, 2011; Stoeber et al., 2010). Regarding reliability, all three subscales have demonstrated satisfactory Cronbach’s alphas ranging from .73 to .90 (Kobori & Tanno, 2004, 2005; Kobori et al., 2011; Stoeber et al., 2010). Regarding validity, two independent confirmatory factor analyses have confirmed the MPCI’s three-factorial structure providing support for the measure’s factorial validity (Kobori & Tanno, 2004; Stoeber et al., 2010). Moreover, Kobori and Tanno (2004) found that all three MPCI subscale scores showed large-sized correlations with the PCI total score providing support for the measure’s convergent

²Throughout this article, capitalized terms (e.g., Personal Standards) refer to the scales or scale scores whereas non-capitalized terms (e.g., personal standards) refer to the psychological constructs the scales intend to measure.

validity. Like the PCI, the MPCCI subscales have shown large-sized positive correlations with measures of trait perfectionism and medium-sized positive correlations with indicators of psychological maladjustment such as negative affect and performance anxiety (Kobori & Tanno, 2004, 2005; Kobori et al., 2011; Stoeber et al., 2010). Moreover, MPCCI subscale scores have shown to explain variance in negative affect and performance anxiety over and above variance explained by trait perfectionism (Kobori et al., 2011; Stoeber et al., 2010) attesting that—like the PCI total score—the MPCCI subscale scores show incremental validity over measures of trait perfectionism.

There are however significant differences to the PCI. First, in line with Kobori and Tanno's (2004) intention to develop a multidimensional inventory capturing positive and negative perfectionism cognitions, the MPCCI subscales have shown positive correlations not only with negative automatic thoughts, but also with positive automatic thoughts (Kobori & Tanno, 2004). Whereas Pursuit of Perfection showed positive correlations with positive and negative thoughts, Personal Standards showed a positive correlation only with positive thoughts, and Concern over Mistakes only with negative automatic thoughts. Second, the MPCCI subscales have shown positive correlations not only with negative affect, but also with positive affect (Kobori & Tanno, 2004, 2005; Stoeber et al., 2010). In this, the typical pattern of findings was that Personal Standards showed medium-sized positive correlations with positive affect whereas Pursuit of Perfection and Concern over Mistakes showed medium-sized positive correlations with negative affect. Together the findings suggest that the MPCCI's Personal Standards subscale captures positive perfectionism cognitions and the Concern over Mistakes subscale captures negative perfectionism cognitions whereas the Pursuit of Perfection subscale, capturing perfectionism cognitions that appear ambivalent (i.e., less positive than personal standards cognitions, and less negative than concern over mistakes concerns), lies somewhere between the two other subscales.

Open questions. There remained however a major question about the MPCCI, namely how the MPCCI performs in predicting psychological adjustment and maladjustment when directly compared to the PCI. Stoeber et al. (2010) suggested that the MPCCI would have a clear advantage over the PCI because the MPCCI provides for a multidimensional assessment of perfectionism cognitions which may—by means of the different dimensions’ mutual suppression of criterion-irrelevant variance similar to the suppressor situations found with multidimensional trait perfectionism—explain more variance in psychological adjustment and maladjustment than unidimensional conceptions. This suggestion, however, was never tested. In addition, the MPCCI has never been examined in relation to depressive symptoms, a key indicator of psychological maladjustment. Whereas the PCI has shown to explain variance in depressive symptoms over and above measures of trait perfectionism (Flett et al., 1998; Flett et al, 2012; Flett et al., 2007) and the MPCCI has shown to explain variance in positive and negative affect over and above measures of trait perfectionism (Stoeber et al., 2010), a critical question for the MPCCI’s incremental validity was if the MPCCI would explain variance in psychological adjustment and maladjustment over and above variance explained by the PCI.

The Present Study

Against this background, the main aim of the present study was to investigate whether suppressor situations similar to those in the multidimensional assessment of trait perfectionism can also be found in the multidimensional assessment of perfectionism cognitions. For this, we compared the PCI and MPCCI regarding their ability to explain variance in three indicators of psychological adjustment and maladjustment: positive affect, negative affect, and depressive symptoms. Based on suggestions that multidimensional conceptions of perfectionism have more explanatory power than unidimensional conceptions by means of mutual suppression, we expected a multidimensional assessment to explain more variance in positive affect, negative

affect, and depressive symptoms than a unidimensional assessment. To this aim, we not only compared the predictive power of the MPCCI subscale scores (representing a multidimensional assessment) with that of the PCI total score (representing a unidimensional assessment), but also reexamined the dimensionality of the PCI by investigating the PCI's factor structure by means of exploratory factor analysis. Based on how the PCI was developed, the inspection of the PCI items, and the reanalysis of the principal components analyses reported by Flett and colleagues (1998, 2012), we expected the PCI to be multidimensional and show at least two substantial factors. Moreover, we expected factors to emerge that represented perfectionism cognitions reflecting the two main factors found in measures of trait perfectionism: perfectionistic strivings and perfectionistic concerns. If so, we expected that PCI factors (like the MPCCI subscales representing a multidimensional assessment of perfectionism cognitions) would also explain more variance in the outcome variables than the PCI total score. Moreover, we investigated how the MPCCI would fare if we computed a MPCCI total score³ and compared its predictive power against the MPCCI subscale scores. Finally, as a secondary aim, we investigated the incremental validity of the MPCCI by examining whether the MPCCI subscale scores would explain variance in positive affect, negative affect, and depressive symptoms over and above variance explained by the PCI.

Method

Participants and Procedure

³Note that computing MPCCI total scores combining the item responses from all three subscales is not recommended because the MPCCI is a multidimensional measure and the MPCCI subscales have shown differential associations with positive versus negative outcomes (Kobori & Tanno, 2004; Kobori et al., 2011; Stoeber et al., 2010). In the present study, the MPCCI total score was computed only for illustrative purposes following a reviewer's suggestion.

A sample of 326 students (57 male, 269 female) was recruited at the University of Kent via the School of Psychology's Research Participation Scheme (RPS). Mean age of students was 19.7 years ($SD = 3.9$). Students volunteered to participate in the study for RPS credits or a raffle for £50 (~US \$80) and completed all measures online using the School's secure Qualtrics® system. The study was approved by the relevant ethics committee and followed the British Psychological Society's (2009) code of ethics and conduct.

Measures

PCI and MPCI. Participants first completed the PCI (Flett et al., 1998) using the PCI's standard instructions: Participants were told that the items described thoughts about perfectionism that sometimes pop into people's heads and that they should indicate how frequently, if at all, they had these thoughts in the past week using a 5-point answer subscale from 0 (*never*) to (4) *always*. Next, they completed the MPCI (English version: Kobori, 2006; Stoeber et al., 2010), which has the same instructions as the PCI, but uses a 4-point answer subscale from 1 (*never*) to 4 (*always*).

Positive and negative affect. To measure positive and negative affect, we used the short form of the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) that Stoeber, Harvey, Ward, and Childs (2011) constructed by consulting Table 5 of Watson and colleagues' (1988) article and taking the five items with the highest loadings on the positive affect factor to measure positive affect (enthusiastic, interested, determined, excited, inspired), and the five items with the highest loadings on the negative affect factor to measure negative affect (scared, afraid, upset, distressed, jittery). The short form has shown reliability and validity in two studies (Stoeber et al., 2011; Stoeber, Hoyle, & Last, 2013). Participants were asked how they felt during the past week and responded to the items on a subscale from 1 (*very slightly or not at all*) to 5 (*extremely*).

Depressive symptoms. To measure depressive symptoms, we used the short form of the Center for Epidemiological Studies–Depression subscale (Radloff, 1977) developed by Cole, Rabin, Smith, and Kaufman (2004). The short form comprises 10 items capturing depressive symptoms (e.g., “I felt my life had been a failure”) and has shown reliability and validity in numerous studies (e.g., Cheung, Liu, & Yip, 2007; Cole et al., 2004; Rice, Ashby, & Slaney, 2007). Participants were asked how they felt during the past week and responded to the items on a subscale from 1 (*rarely or none of the time [less than 1 day]*) to 4 (*all of the time [5-7 days]*).

Preliminary Analyses

All analyses were conducted with IBM SPSS Version 19. First we computed subscale scores by averaging item responses across items. Because multivariate outliers can severely distort the results of correlation and regression analyses (Tabachnick & Fidell, 2007), we examined the scores for multivariate outliers and excluded two female participants with a Mahalanobis distance larger than $\chi^2(7) = 24.32, p < .001$ from all further analyses. With this, our final sample comprised 324 (57 male, 267 female) participants. Next, we examined whether the variance–covariance matrices of male and female participants differed by computing a Box’s *M* test with gender as between-participants factor (see again Tabachnick & Fidell, 2007). The test was nonsignificant (Box’s *M* = 36.08, $F[28, 35736] = 1.23, p = .188$). Consequently, all analyses were collapsed across gender. Finally, we examined the scores’ reliability. With Cronbach’s alphas from .79 to .95 (see Table 2), all scores displayed satisfactory reliability (Nunnally & Bernstein, 1994).

Results

PCI: Exploratory Factor Analysis

First, we conducted a principal components analysis of the responses to the 25 PCI items and found four eigenvalues > 1 (10.88, 1.84, 1.73, 1.12) explaining 43.5%, 7.3%, 6.9%, and 4.5%

of variance. Because Kaiser's eigenvalue > 1 rule is notorious for retaining too many factors (cf. Zwick & Velicer, 1986), we examined the eigenvalues with a scree test (Cattell & Vogelmann, 1977), parallel analysis (RanEigen; Enzmann, 1997), and Velicer's minimum average partial (MAP) test (*psych*; Revelle, 2013). All three tests suggested retaining three components (see Figure 1 showing the eigenvalue plot with an "elbow" after the third component) that, after varimax rotation, explained 21.5%, 20.9%, and 15.4% (overall 57.8%) of variance.

Because principal components analyses is not a proper factor analysis (cf. Fabrigar, Wegener, MacCallum, & Strahan, 1999; Russell, 2002), we next conducted an exploratory factor analysis using principal axis factoring to extract three factors followed by promax rotation, a method for rotation to oblique simple structure as recommended by Russell (2002). Table 1 shows the factor loadings of the resulting pattern matrix. As expected, the three factors showed large-sized positive correlations ($.55 \leq r \leq .65$). Moreover, because the PCI was not conceptualized as a multidimensional measure, a number of items showed substantial cross-loadings (i.e., absolute loadings > .30 on more than one factor).

Still, when regarding the items with the highest unique loadings as marker items, there were apparent differences in content between the three factors. Factor 1 (F1) showed the highest unique loadings from Item 16 ("Why can't things be perfect?") and Item 1 ("Why can't I be perfect?") suggesting that F1 captured perfectionistic doubts. However, regarding the other items that showed unique loadings > .50 on this factor (Items 3, 10, 11, 18, 22, 25), this indicated that F1 captured not only doubts, but the full range of perfectionistic concerns described in the literature such as concerns about mistakes, self-ideal discrepancies, and other people's evaluations (Stoeber & Otto, 2006). Consequently, we labeled the first factor "F1 (perfectionistic concerns)." Factor 2 (F2) showed the highest unique loadings from Item 13 ("My goals are very high") and Item 23 ("I certainly have high standards") suggesting that F2 captured perfectionistic strivings. Regarding

the other items that showed unique loadings $> .50$ on this factor (Items 12, 14, 17, 19) confirmed this interpretation. Hence we labeled the second factor “F2 (perfectionistic strivings).” Factor 3 (F3) showed the highest unique loadings from Item 7 (“I should be doing more”) and Item 2 (“I need to do better”) suggesting that F3 captured perfectionistic demands for self-improvement. Therefore we labeled the third factor “F3 (perfectionistic demands).” However, regarding items that showed unique loadings $> .40$ (Items 4, 8, 21; no item showed unique loadings $> .50$), this indicated that F3 also included concerns about mistakes (Items 4, 8) suggesting that F3 was a complex factor that captured perfectionistic demands for self-improvement including both approach (do better) and avoidance (avoid mistakes) cognitions (cf. Slade & Owens, 1998).

Correlations

Next, we computed factor scores representing the three PCI factors shown in Table 1 and examined the bivariate correlations of PCI and MPCSI subscale scores. The reason for computing factor scores was to create PCI scores that best represented the factors from the EFA of the 25 PCI items, including all items with substantial cross-loadings. Hence, we opted for the regression method because this method maximizes the correlation between factor scores and factors (see DiStefano, Zhu, & Mîndrilă, 2009, for details). Table 2 shows the results.

As expected, PCI and MPCSI subscale scores showed large-sized positive correlations ($.50 \leq r_s \leq .87$) providing support for the measures’ convergent validity. The correlation pattern between PCI factor scores and MPCSI subscale scores, however, was not fully as expected. As expected, F1 (perfectionistic concerns) showed a significantly larger correlation with Concern over Mistakes than with Personal Standards, z difference = 5.26, $p < .001$ (Meng, Rosenthal, & Rubin, 1992). However, the correlation with Pursuit of Perfection was larger than the one with Concern over Mistakes, $z = 3.62$, $p < .001$. As expected, F2 (perfectionistic strivings) showed a significantly larger correlation with Personal Standards than with Concern over Mistakes, $z = 4.04$, $p < .001$.

However, the correlation with Personal Standards was of similar size as that with Pursuit of Perfection, $z = 0.21$, *ns*. In contrast, the correlation pattern of F3 (perfectionistic demands) was as expected because F3 showed higher correlations with Concern over Mistakes and Pursuit of Perfection than with Personal Standards, $z_s > .3.68$, $p_s < .001$, confirming that this factor captured perfectionistic demands for self-improvement in which concerns over mistakes play a significant role.

Regarding the correlations with psychological adjustment, the PCI total score showed positive correlations with negative affect and depressive symptoms, but no significant correlation with positive affect thus replicating previous findings (e.g., Flett et al., 1998). The same went for the three PCI factor scores with the exception of F2 (perfectionistic strivings) which showed positive correlations not only with negative affect and depressive symptoms, but also with positive affect suggesting that F2 captured perfectionism cognitions that have positive aspects. The MPCSI subscale scores showed a similar pattern of correlations with psychological adjustment, but there were two notable differences. First, the MPCSI total score, Personal Standards, and Pursuit of Perfection all showed positive correlations with positive affect. Second, all MPCSI subscale scores showed positive correlations with negative affect and depressive symptoms with the exception of Personal Standards which showed a positive correlation with negative affect, but no significant correlation with depressive symptoms, confirming previous findings that the MPCSI captures perfectionism cognitions that have positive and negative aspects.

Regression Analyses

Finally, we investigated how the PCI and MPCSI compared in their ability to explain variance in positive affect, negative affect, and depressive symptoms (consecutively referred to as the dependent variables [DVs]) and conducted a series of four hierarchical regression analyses to investigate two questions. First, would a multidimensional assessment of perfectionism cognitions

(using PCI factor scores or MPCCI subscale scores as simultaneous predictors) explain more variance in the DVs than a unidimensional assessment (using the PCI total score or the MPCCI total score as predictor) by means of mutual suppression of criterion-irrelevant variance? Second, would the MPCCI subscale scores show incremental validity explaining variance in positive affect, negative affect, and depressive symptoms over and above variance explained by the PCI total score and factor scores? In the first series of regression analyses (Regression Analyses 1.1), we entered the PCI total score in Step 1 and the MPCCI subscale scores in Step 2. In the second series (Regression Analyses 1.2), we entered the PCI factor scores in Step 1 and the MPCCI subscale scores in Step 2. In the third series (Regression Analyses 2.1), we entered the MPCCI total score in Step 1 and the PCI factor scores in Step 2. In the fourth and final series (Regression Analyses 2.2), we entered the MPCCI subscale scores in Step 1 and the PCI factor scores in Step 2. In all steps, predictors were entered simultaneously. Because the predictors showed substantial intercorrelations (see Table 2), we screened for multicollinearity by examining if any predictor's variance inflation factor (VIF) exceeded the critical value of 10 (Kutner, Nachtsheim, & Neter, 2004). However, no predictor showed a $VIF > 4.45$ indicating that multicollinearity was not an issue. Table 3 summarizes the results of the regression analyses.

As to the first question, we first examined the PCI comparing Step 1 of Regression Analyses 1.1 and Step 1 of Regression Analyses 1.2. Results showed that, when PCI factor scores were used instead of the PCI total score, the PCI explained significant variance in all three DVs including positive affect. Moreover, even though the PCI total score showed very large positive correlations with the PCI factor scores ($.80 \leq rs \leq .91$), the factor scores explained a larger percentage of variance in the DVs than did the total score (total score: 0.5–15.7%; factor scores: 10.0–30.5%). Why the factor scores explained more variance in the DVs than the total score may be explained by the patterns of mutual suppression that were evident when factor scores were

used. Regarding positive affect, only F2 (perfectionistic strivings) showed a significant bivariate correlation, and the correlation was positive. In contrast, when all three factors scores were entered simultaneously as predictors, both F1 (perfectionistic concerns) and F2 (perfectionistic concerns) displayed significant regression weights, with F1 (perfectionistic concerns) showing a negative weight and F2 (perfectionistic concerns) a positive weight. Regarding negative affect and depressive symptoms, the pattern was different because all three factor scores showed significant bivariate correlations, and all were positive. However, when the factors scores were entered simultaneously, F2 (perfectionistic strivings) changed signs and became a significant negative predictor of both negative affect and depressive symptoms.

A similar pattern emerged when the MPCCI was regarded. Comparing Step 1 of the Regression Analysis 2.1 and Step 1 of the Regression Analyses 2.2 showed that—whereas the total score explained significant variance in all three DVs and the MPCCI total score showed very large positive correlations with the MPCCI subscale scores ($.85 \leq r_s \leq .89$)—the subscale scores explained a larger percentage of variance than the total score (total score: 2.5–12.0%; subscale scores: 9.6–26.9%). Moreover, like with the PCI, there was evidence of mutual suppression when all three subscale scores were entered simultaneously to predict the DVs. Regarding positive affect, Personal Standards and Pursuit of Perfection both (or all) showed significant bivariate correlations, and both were positive. However, when all three MPCCI subscales were entered simultaneously, Personal Standards and Concern over Mistakes showed significant regression weights: Personal Standards a positive and Concern over Mistakes a negative regression weight (whereas Pursuit of Perfection was no longer a significant predictor). Regarding negative affect, all three subscale scores showed significant bivariate correlations, and all were positive. When the subscale scores were entered simultaneously, all three continued to show significant regression weights, but Personal Standards changed signs and became a negative predictor. Regarding

depressive symptoms, only Pursuit of Perfection and Concern over Mistakes showed significant bivariate correlations, and both were negative. When all three subscale scores were entered simultaneously, however, all three showed significant regression weights. In this, Pursuit of Perfection and Concern over Mistakes showed positive regression weights whereas Personal Standards—as was the case with negative affect—showed a negative regression weight.

As to the second question, we first examined whether the MPCCI (as the more recently developed instrument) showed incremental validity explaining variance in the DVs above the variance explained by the PCI (as the established instrument). As Step 2 of Regression Analyses 1.1 and Step 2 of Regression Analyses 1.2 showed (see Table 3), the MPCCI subscale scores explained an additional 7.2–17.0% variance in the DVs above the variance explained by the PCI total score and an additional 3.0–6.0% above that explained by the PCI factor scores. Across both analyses, MPCCI Personal Standards and Concern over Mistakes showed significant regression weights. In this, Personal Standards positively predicted positive affect and negatively predicted depressive symptoms whereas Concern over Mistakes positively predicted negative affect and depressive symptoms.

The findings suggest that the MPCCI has incremental validity over the PCI even when (the more powerful) PCI factor scores are used to predict positive affect, negative affect, and depressive symptoms. However, a similar pattern emerged when the PCI factor scores were entered as predictors after the MPCCI total score and subscale scores had been entered, as Step 2 of Regression Analyses 2.1 and Step 2 of Regression Analyses 2.2 showed (see again Table 3). The PCI factor scores explained an additional 9.1–23.1% variance in the DVs above the variance explained by the MPCCI total score and an additional 3.9–9.5% above that explained by the MPCCI subscale scores. Across both analyses, F1 (perfectionistic concerns) negatively predicted positive affect and positively predicted negative affect and depressive symptoms, F2 (perfectionistic

strivings) negatively predicted negative affect and depressive symptoms, and F3 (perfectionistic demands) positively predicted negative affect.

Discussion

The main aim of the present study was to investigate whether a multidimensional assessment of perfectionism cognitions had advantages over a unidimensional assessment by examining how the Perfectionism Cognitions Inventory (PCI; Flett et al., 1998) and the Multidimensional Perfectionism Cognitions Inventory (MPCI; Kobori & Tanno, 2004) explained variance in psychological adjustment and maladjustment. Related to this aim, we reexamined the dimensionality of the PCI by means of exploratory factor analysis and found three substantial factors—capturing perfectionism cognitions about perfectionistic concerns (Factor 1), perfectionistic strivings (Factor 2), and perfectionistic demands (Factor 3)—indicating that the PCI is multidimensional rather than unidimensional as originally suggested. When factor scores representing the three PCI factors were used in regression analyses as predictors of positive affect, negative affect, and depressive symptoms, all factor scores emerged as significant predictors. In contrast, the PCI total score did not explain significant variance in positive affect (cf. Flett et al., 1998). Furthermore, the PCI explained more variance not only in positive affect, but also in negative affect and depressive symptoms when the PCI factor scores were used as predictors than when the PCI total score was used.

A similar pattern of results was obtained for the MPCI. In line with previous findings (Kobori & Tanno, 2004, 2005; Stoeber et al., 2010), the three MPCI subscale scores—capturing perfectionism cognitions about personal standard, pursuit of perfection, and concern over mistakes—explained significant variance in both positive and negative affect. In addition, they explained significant variance in depressive symptoms. Furthermore, as was the case with the PCI factor scores, the MPCI explained more variance in positive affect, negative affect, and

depressive symptoms when the MPCCI subscale scores were used as predictors than when the MPCCI total score was used. In sum, the present findings indicate that, regardless of whether the PCI or the MPCCI was used, a multidimensional assessment of perfectionism cognitions had advantages over a unidimensional assessment in predicting and explaining variance in psychological adjustment and maladjustment.

Perfectionism Cognitions: Why Better If Multidimensional?

But why should the PCI factor scores and MPCCI subscale scores explain more variance than the PCI and MPCCI total scores? The present findings suggest that mutual suppression is the key to answering this question. In a multidimensional assessment, perfectionistic strivings cognitions and perfectionistic concerns cognitions act as mutual suppressors in the prediction of positive and negative outcomes (cf. A. P. Hill, in press; R. W. Hill et al., 2010). Only the PCI factor scores and the MPCCI subscale scores (but not the total scores) differentiate between these cognitions; and when the scores are regarded simultaneously as predictors of positive and negative outcomes, they create a “suppressor situation” (Paulhus et al., 2004) mutually enhancing their predictive validity.

Suppressor situations are situations in which it is unclear what the predictor variables and what the suppressor variables are because all variables represent possible predictors and—when entered simultaneously into a regression—show various degrees of mutual suppression (Tzelgov & Henik, 1991). Hence suppressor situations not only cover the classic situation (Horst, 1941) where a variable that shows “zero validity” in its bivariate relationship with the criterion is entered as predictor in a regression together with a valid predictor (i.e., a predictor that shows a significant bivariate correlation with the criterion), the variable increases the validity of the predictor by “suppressing” criterion-irrelevant variance in the predictor. Suppressor situations include all situations where variables change their predictive validity when entered together with

other variables in predicting a criterion, for example, by changing signs (a significant positive predictor becomes a significant negative predictor and vice versa), by showing increased validity (the predictor's standardized regression weight is larger than its bivariate correlation), or both (Paulhus et al., 2004).

As Paulhus and colleagues (2004) argued, suppressor situations in personality research and assessment are often overlooked or are regarded as unreliable and not replicable, even though there are exemplary cases of reliable and replicable suppressor situations. The first is the case of guilt and shame predicting aggression where guilt becomes a stronger negative predictor of aggression and shame a stronger positive predictor when guilt and shame are simultaneously taken into account. The second is the case of self-esteem and narcissism predicting antisocial behavior where self-esteem becomes a stronger negative predictor of antisocial behavior and narcissism a stronger positive predictor when self-esteem and narcissism are simultaneously taken into account. As the present findings together with previous findings on trait perfectionism demonstrate, perfectionistic strivings and perfectionistic concerns—whether conceptualized as traits or cognitions—represent another exemplary case in personality research and assessment where suppressor situations can be reliably demonstrated and replicated in addition to the cases previously identified by Paulhus et al. (2004).

Understanding Suppression Effects

Understanding suppression effects is often not easy, and there are different ways to explain how these effects come about (Meyers, Gamst, & Guarino, 2005). One way to understand the present findings is that including perfectionistic concerns in the equation subtracts out the variance in psychological adjustment and maladjustment due to perfectionistic concerns (comprising aspects of perfectionism that are negative). As a consequence, perfectionistic strivings become a stronger positive predictor of psychological adjustment and a stronger

negative predictor of psychological maladjustment. Conversely, albeit to a lesser degree, including perfectionistic strivings in the equation subtracts out the variance in psychological adjustment and maladjustment due to perfectionistic strivings (comprising aspects of perfectionism that are often positive). As a consequence, perfectionistic concerns become a stronger positive predictor of psychological maladjustment and a stronger negative predictor of psychological adjustment.

Another way to understand the present findings is that, when regarding bivariate correlations, the positive effects of perfectionistic strivings are often “masked” because perfectionistic strivings show large-sized positive correlations with perfectionistic concerns. Regarding trait perfectionism, Stoeber and Otto (2006) found correlations of up to .70; and in the present study, perfectionism cognitions about perfectionistic strivings showed correlations of up to .71 with perfectionism cognitions about perfectionistic concerns. Because perfectionistic concerns have strong negative effects (positive relationships with psychological maladjustment and negative relationships with psychological adjustment), they often overshadow perfectionistic strivings’ positive effects (positive relationships with psychological adjustment and negative relationships with psychological maladjustment). Including perfectionistic concerns in the equation therefore clears out the “negativity” in perfectionistic strivings’ predictive validity that is due to its covariance with perfectionistic concerns, thereby making room for the positive effects of perfectionistic strivings to show. Conversely, including perfectionistic strivings in the equation clears out the “positivity” in perfectionistic concerns’ predictive validity that is due to its covariance with perfectionistic strivings and makes room for the negative effects of perfectionistic concerns to show even more clearly. Because perfectionistic concerns are usually more negative than perfectionistic strivings are positive, the mutual suppression effects are typically stronger for perfectionistic strivings than for perfectionistic concerns (cf. A. P. Hill, in

press; R. W. Hill et al., 2010).

Whereas it is important to take the bivariate relationships into account when interpreting the unique relationships the different dimensions of perfectionism cognitions show when their effects are regarded simultaneously (A. P. Hill, in press), it is important to acknowledge that the different dimensions—when used simultaneously as predictors of positive and negative outcomes—show suppression effects resulting in unique relationships that markedly differ from the bivariate relationships regarding size, direction, or both. For researchers this means that they need to go beyond a unidimensional conception and assessment of perfectionism if they want to increase the predictive power, and predictive validity, of perfectionism cognitions when investigating their relationships with and effects on indicators of psychological adjustment and maladjustment. Else they risk missing important relationships and effects (e.g., perfectionism cognitions predicted positive affect, but not when the PCI total score was used a predictor) or fail to disentangle the unique effects of perfectionistic strivings cognitions and perfectionistic concerns cognitions (e.g., perfectionistic strivings cognitions positively predicted positive affect whereas perfectionistic concerns cognitions negatively predicted positive affect when PCI factor scores were used as predictors).

Trying to understand how these effects show in the everyday lives of individual perfectionists, however, is as difficult as trying to answer the question of how practitioners (e.g., counselors, therapists) can make use of the knowledge of these effects. The reason is that suppressor situations are defined by sample characteristics of variables (e.g., the variables' variance and covariance; Tzelgov & Henik, 1991) which do not readily translate to individual cases because the negative effects of perfectionistic concerns usually overshadow any positive effects of perfectionistic strivings. However, it would be safe to assume that—if we have two individuals who report the same frequency of perfectionistic concerns cognitions, but different

frequencies of perfectionistic strivings cognitions—the individual reporting a higher frequency of strivings cognitions should feel better (more positive affect, less negative affect, fewer depressive symptoms) than the individual reporting a lower frequency of strivings cognitions.

Conversely—if we have two individuals who report the same frequency of perfectionistic strivings cognitions, but different frequencies of perfectionistic concerns cognitions—the individual reporting a higher frequency of concerns cognition should feel worse (less positive affect, more negative affect, more depressive symptoms) than the individual reporting a lower frequency of concerns cognitions. Consequently, practitioners seeing clients who suffer from perfectionism should perhaps be less concerned about their clients' reporting cognitions about perfectionistic strivings. Instead it may be more useful if practitioners would focus their efforts on the more negative aspects of perfectionism and address their clients' cognitions about perfectionistic concerns and perfectionistic demands (cf. Shafran, Egan, & Wade, 2010).

Comparing PCI and MPCCI

A secondary aim of the present research was to compare the PCI and MPCCI. In this a key question was if the MPCCI (the more recently developed instrument) would show incremental validity when compared to the PCI (the established instrument). Results showed that the MPCCI subscale scores explained additional variance in psychological adjustment and maladjustment above the variance explained by the PCI not only when the PCI total score was used to predict positive affect, negative affect, and depressive symptoms, but also when the PCI factor scores were used. Whereas this finding suggests that the MPCCI has incremental validity over the PCI, it is important to note that parallel results were obtained for the PCI. When PCI factor scores were used to predict positive affect, negative affect, and depressive symptoms, the PCI explained additional variance in psychological adjustment and maladjustment above the variance explained by either MPCCI total score or MPCCI subscale scores.

Whereas the findings indicate that PCI and MPCCI are not redundant, it is important to note that the PCI factor scores explained overall more variance than the MPCCI subscale scores. Whereas the PCI factor scores explained about the same percentage of variance in positive affect as the MPCCI subscales scores, they explained a larger percentage of variance in negative affect and depressive symptoms than the MPCCI subscale scores. Moreover, the MPCCI Pursuit of Perfection scores failed to explain any variance in psychological adjustment and maladjustment after the variance explained by the PCI had been taken into account, regardless of whether the PCI total score or the PCI factor scores were used. Hence the PCI seems to contain items capturing perfectionism cognitions that show stronger positive and negative links to psychological maladjustment than those of the MPCCI. Why this is the case—perhaps the 25 items of the PCI capture perfectionism cognitions in greater breadth and depth than the 15 items of the MPCCI—and if this extends to other indicators of psychological adjustment and maladjustment, however, remains for future studies to investigate.

Limitations and Conclusion

The present study has a number of limitations. First, the results of the exploratory factor analysis need to be replicated. Whereas we are confident that the PCI is multidimensional, the exact loading patterns that the PCI items showed in the present study's three-factor solution may not replicate in other samples, and future studies may find individual items to show diverging loading patterns. Moreover, some correlations that the PCI factor scores showed with the MPCCI Pursuit of Perfection scores were unexpected. Whether these correlations represent a validity problem of the PCI factor scores or the Pursuit of Perfection scores also remains for future studies to be seen. Second, the study employed a cross-sectional design. Hence the results of the regression analyses cannot be interpreted in a causal or temporal sense. Future studies need to employ longitudinal correlational designs such as week-to-week assessments (e.g., Sherry et al.,

2012) to examine whether the relationships the present study's regression analyses found also hold longitudinally. Third, the study investigated university students. Consequently, future studies need to explore if the present findings generalize to community and clinical samples (cf. Cox, Enns, & Clara, 2002; Sherry et al., 2009).

Despite these limitations, the findings from the present study make an important contribution to the understanding of perfectionism cognitions and their assessment because they suggest that—like in the assessment of trait perfectionism (Enns & Cox, 2002; Hewitt et al., 2003)—a multidimensional assessment of perfectionism cognitions has advantages over a unidimensional assessment if we want to further progress our understanding of the correlates and consequences of perfectionistic thinking with regard to both psychological adjustment and psychological maladjustment.

References

- Bardone-Cone, A. M., Sturm, K., Lawson, M. A., Robinson, D. P., & Smith, R. (2010). Perfectionism across stages of recovery from eating disorders. *International Journal of Eating Disorders, 43*, 139–148.
- Besser, A., Flett, G. L., Hewitt, P. L., & Guez, J. (2008). Perfectionism, and cognitions, affect, self-esteem, and physiological reactions in a performance situation. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 26*, 206–228.
- British Psychological Society. (2009). *Code of ethics and conduct*. London: Author.
- Burns, J. L., Lee, R. M., & Brown, L. J. (2011). The effect of meditation on self-reported measures of stress, anxiety, depression, and perfectionism in a college population. *Journal of College Student Psychotherapy, 25*, 132–144.
- Cattell, R. B., & Vogelmann, S. (1977). A comprehensive trial of the scree and KG criteria for determining the number of factors. *Journal of Multivariate Behavioral Research, 12*, 289–325.
- Cheung, Y. B., Liu, K. Y., & Yip, P. S. F. (2007). Performance of the CES-D and its short forms in screening suicidality and hopelessness in the community. *Suicide and Life-Threatening Behavior, 37*, 79–88.
- Cole, J. C., Rabin, A. S., Smith, T. L., & Kaufman, A. S. (2004). Development and validation of a Rasch-derived CES-D short form. *Psychological Assessment, 16*, 360–372.
- Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155–159.
- Cox, B. J., Enns, M. W., & Clara, I. P. (2002). The multidimensional structure of perfectionism in clinically distressed and college student samples. *Psychological Assessment, 14*, 365–373.
- DiStefano, C., Zhu, M., & Mindrila, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research & Evaluation,*

14(20).

- Enns, M. W., & Cox, B. J. (2002). The nature and assessment of perfectionism: A critical analysis. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 33–62). Washington, DC: American Psychological Association.
- Enzmann, D. (1997). RanEigen: A program to determine the parallel analysis criterion for the number of principal components. *Applied Psychological Measurement, 21*, 232.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272–299.
- Fleeson, W. (2012). Perspectives on the person: Rapid growth and opportunities for integration. In K. Deaux & M. Snyder (Eds.), *The Oxford handbook of personality and social psychology* (pp. 33–63). New York: Oxford University Press.
- Flett, G. L., & Hewitt, P. L. (2002). Perfectionism and maladjustment: An overview of theoretical, definitional, and treatment issues. In P. L. Hewitt & G. L. Flett (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 5–31). Washington, DC: American Psychological Association.
- Flett, G. L., Hewitt, P. L., Blankstein, K. R., & Gray, L. (1998). Psychological distress and the frequency of perfectionistic thinking. *Journal of Personality and Social Psychology, 75*, 1363–1381.
- Flett, G. L., Hewitt, P. L., Demerjian, A., Sturman, E. D., Sherry, S. B., & Cheng, W. (2012). Perfectionistic automatic thoughts and psychological distress in adolescents: An analysis of the Perfectionism Cognitions Inventory. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30*, 91–104.
- Flett, G. L., Hewitt, P. L., Whelan, T., & Martin, T. R. (2007). The Perfectionism Cognitions Inventory: Psychometric properties and associations with distress and deficits in cognitive

- self-management. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 25, 255–277.
- Flett, G. L., Newby, J., Hewitt, P. L. & Persaud, C. (2011). Perfectionistic automatic thoughts, trait perfectionism, and bulimic automatic thoughts in young women. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 29, 192–206.
- Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research*, 14, 449–468.
- Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in sport adaptive? A systematic review of confirmatory, contradictory, and mixed evidence. *Canadian Psychology*, 53, 263–279.
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology*, 60, 456–470.
- Hewitt, P. L., Flett, G. L., Besser, A., Sherry, S. B., & McGee, B. (2003). Perfectionism is multidimensional: A reply to Shafran, Cooper and Fairburn (2002). *Behaviour Research and Therapy*, 41, 1221–1236.
- Hill, A. P. (in press). Perfectionistic strivings and the perils of partialling. *International Journal of Sport and Exercise Psychology*.
- Hill, A. P., & Appleton, P. R. (2011). The predictive ability of the frequency of perfectionistic cognitions, self-oriented perfectionism, and socially prescribed perfectionism in relation to symptoms of burnout in youth rugby players. *Journal of Sports Sciences*, 29, 695–703.
- Hill, R. W., Huelsman, T. J., & Araujo, G. (2010). Perfectionistic concerns suppress associations between perfectionistic strivings and positive life outcomes. *Personality and Individual Differences*, 48, 584–589.

- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*, 179–185.
- Horst, P. (1941). The role of the predictor variables which are independent of the criterion. *Social Science Research Council*, *48*, 431–436.
- Kobori, O. (2006). *A cognitive model of perfectionism: The relationship of perfectionism personality to psychological adaptation and maladaptation*. Unpublished doctoral dissertation, Department of Cognitive and Behavioral Science, University of Tokyo, Tokyo, Japan.
- Kobori, O., & Tanno, Y. (2004). Development of the Multidimensional Perfectionism Cognitions Inventory. *Japanese Journal of Personality*, *13*, 34–43.
- Kobori, O., & Tanno, Y. (2005). Self-oriented perfectionism and its relationship to positive and negative affect: The mediation of positive and negative perfectionism cognitions. *Cognitive Therapy and Research*, *29*, 559–571.
- Kobori, O., Yoshie, M., Kudo, K., & Ohtsuki, T. (2011). Traits and cognitions of perfectionism and their relation with coping style, effort, achievement, and performance anxiety in Japanese musicians. *Journal of Anxiety Disorders*, *25*, 674–679.
- Kutner, M. H., Nachtsheim, C. J., & Neter, J. (2004). *Applied linear regression models* (4th ed.). New York: McGraw-Hill.
- Lo, A., & Abbott, M. J. (2013a). The impact of manipulating expected standards of performance for adaptive, maladaptive, and non-perfectionists. *Cognitive Therapy and Research*, *37*, 762–778.
- Lo, A., & Abbott, M. J. (2013b). Review of the theoretical, empirical, and clinical status of adaptive and maladaptive perfectionism. *Behaviour Change*, *30*, 96–116.
- Meng, X.-L., Rosenthal, R., & Rubin, D. B. (1992). Comparing correlated correlation

- coefficients. *Psychological Bulletin*, *111*, 172–175.
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2005). *Applied multivariate research: Design and interpretation*. Thousand Oaks, CA: Sage.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Paulhus, D. L., Robins, R. W., Trzesniewski, K. H., & Tracy, J. L. (2004). Two replicable suppressor situations in personality research. *Multivariate Behavioral Research*, *39*, 303–328.
- Pulford, B. D., Johnson, A., & Awaida, M. (2005). A cross-cultural study of predictors of self-handicapping in university students. *Personality and Individual Differences*, *39*, 727–737.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401.
- Revelle, W. (2013). *psych: Procedures for psychological, psychometric, and personality research (R package version 1.3.2)*. Northwestern University, Evanston, IL. Retrieved from <http://bit.ly/152pgvq>
- Rice, K. G., Ashby, J. S., & Slaney, R. B. (2007). Perfectionism and the five-factor model of personality. *Assessment*, *14*, 385–398.
- Rudolph, S. G., Flett, G. L., & Hewitt, P. L. (2007). Perfectionism and deficits in cognitive emotion regulation. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *25*, 343–357.
- Russell, D. W. (2002). In search of underlying dimensions: The use (and abuse) of factor analysis in Personality and Social Psychology Bulletin. *Personality and Social Psychology Bulletin*, *28*, 1629–1646.
- Shafran, R., Egan, S., & Wade, T. (2010). *Overcoming perfectionism: A self-help guide using*

cognitive behavioral techniques. London: Robinson.

- Sherry, S. B., MacKinnon, A. L., Fossum, K.-L., Antony, M. M., Stewart, S. H., Sherry, D. L., ..., Mushquash, A. R. (2012). Perfectionism, discrepancies, and depression: Testing the perfectionism social disconnection model in a short-term, four-wave longitudinal study. *Personality and Individual Differences, 54*, 692–697.
- Sherry, S. B., Vriend, J. L., Hewitt, P. L., Sherry, D. L., Flett, G. L., & Wardrop, A. A. (2009). Perfectionism dimensions, appearance schemas, and body image disturbance in community members and university students. *Body Image, 6*, 83–89.
- Slade, P. D., & Owens, R. G. (1998). A dual process model of perfectionism based on reinforcement theory. *Behavior Modification, 22*, 372–390.
- Slaney, R. B., Rice, K. G., Mobley, M., Trippi, J., & Ashby, J. S. (2001). The revised Almost Perfect Scale. *Measurement and Evaluation in Counseling and Development, 34*, 130–145.
- Stoeber, J., Harvey, M., Ward, J. A., & Childs, J. H. (2011). Passion, craving, and affect in online gaming: Predicting how gamers feel when playing and when prevented from playing. *Personality and Individual Differences, 51*, 991–995.
- Stoeber, J., Hoyle, A., & Last, F. (2013). The Consequences of Perfectionism Sscale: Factorial structure and relationships with perfectionism, performance perfectionism, affect, and depressive symptoms. *Measurement and Evaluation in Counseling and Development, 46*, 178–191.
- Stoeber, J., Kobori, O., & Tanno, Y. (2010). The Multidimensional Perfectionism Cognitions Inventory–English (MPCI–E): Reliability, validity, and relationships with positive and negative affect. *Journal of Personality Assessment, 92*, 16–25.
- Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review, 10*, 295–319.

- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson.
- Tzelgov, J., & Henik, A. (1991). Suppression situations in psychological research: Definitions, implications, and applications. *Psychological Bulletin, 109*, 524–536.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.
- Wimberley, T. E., & Stasio, M. J. (2013). Perfectionistic thoughts, personal standards, and evaluative concerns: Further investigating relationships to psychological distress. *Cognitive Therapy and Research, 37*, 277–283.
- Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99*, 432–442.

Table 1

Perfectionism Cognitions Inventory (PCI): Three-Factorial Structure and Item Loadings

Item	Factor		
	F1	F2	F3
16. Why can't things be perfect?	.81	-.06	.08
1. Why can't I be perfect?	.81	-.20	.17
3. I should be perfect.	.72	.16	-.03
11. People expect me to be perfect.	.63	.15	-.11
18. It would be great if everything in my life were perfect.	.56	.00	.22
22. I can't do this perfectly.	.54	-.12	.18
24. Maybe I should lower my goals.	.53	.16	-.20
15. I expect to be perfect.	.53	.42	-.12
10. No matter how much I do, it's never enough.	.51	.16	.16
20. Things are seldom ideal.	.42	.13	.12
13. My goals are very high.	-.16	.92	.00
23. I certainly have high standards.	.09	.78	-.14
14. I can always do better, even if things are almost perfect.	.05	.66	.05
12. I must be efficient at all times.	.15	.62	.05
17. My work has to be superior.	.08	.58	.20
25. I am too much of a perfectionist.	.33	.55	-.32
19. My work should be flawless.	.28	.54	.07
9. I have to work hard all the time.	-.11	.53	.39
6. I have to be the best.	-.01	.53	.33
7. I should be doing more.	-.02	-.15	.79
2. I need to do better.	.22	-.22	.77
5. I've got to keep working on my goals.	-.22	.44	.50
21. How well am I doing?	-.06	.21	.47
8. I can't stand to make mistakes.	.14	.22	.45
4. I should never make the same mistake twice.	.16	.17	.41

Note. $N = 324$. Item loadings are from the pattern matrix of the exploratory factor analysis using principal axis factoring and promax rotation (cf. Russell, 2002). F1 = Factor 1 (perfectionistic concerns); F2 = Factor 2 (perfectionistic strivings); F3 = Factor 3 (perfectionistic demands). $r(F1, F2) = .65$; $r(F1, F3) = .55$; $r(F2, F3) = .55$; all $ps < .001$. Substantial loadings ($|\text{loadings}| > .30$) are boldfaced. Items are ordered according to the highest substantial loadings on their primary factor.

MULTIDIMENSIONAL ASSESSMENT OF PERFECTIONISM

Table 2

Bivariate Correlations, Descriptives Statistics, and Cronbach's Alphas

Variable	1	2	3	4	5	6	7	8	9
PCI									
1. Total score									
2. F1 (perfectionistic concerns)	.91***								
3. F2 (perfectionistic strivings)	.91***	.71***							
4. F3 (perfectionistic demands)	.80***	.62***	.62***						
MPCI									
5. Total score	.87***	.76***	.85***	.65***					
6. Personal Standards	.70***	.51***	.79***	.50***	.87***				
7. Pursuit of Perfection	.82***	.79***	.78***	.63***	.89***	.68***			
8. Concern over Mistakes	.75***	.69***	.64***	.66***	.85***	.58***	.65***		
Psychological adjustment									
9. Positive affect	.07	-.04	.19***	.01	.16**	.26***	.13*	.02	
10. Negative affect	.40***	.43***	.24***	.39***	.35***	.17**	.31***	.43***	.16
11. Depressive symptoms	.35***	.46***	.14*	.35***	.28***	.04	.25***	.44***	-.44
<i>M</i>	1.71 ^a	0	0	0	2.21	2.42	1.89	2.32	3.35
<i>SD</i>	0.82	.96	.96	.93	0.66	0.78	0.75	0.74	0.78
Cronbach's alpha	.95	—	—	—	.93	.89	.89	.85	.82

Note. $N = 324$. PCI = Perfectionism Cognitions Inventory with F1, F2, and F3 = factor scores representing Factor 1, Factor 2, and Factor 3 from an exploratory factor analysis shown in Table 1. MPCI = Multidimensional Perfectionism Cognitions Inventory—English version. All scores were computed using the regression method resulting in scores with $M = 0$ and $SD =$ the squared multiple correlation. Cronbach's alphas are available for items if principle axis extraction is used (see DiStefano et al., 2009, for details). Because of the differential variances of the items when regressing items on factor scores, Cronbach's alphas are not available for factor scores (—).

^aWhen the PCI total score was computed by summing across items (cf. Flett et al., 1998), the mean was $M = 42.7$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Regression Analyses: PCI and MPCCI Predicting Psychological Adjustment and Maladjustment

Predictor	Positive affect		Negative affect		Depressive symptoms	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
<i>Regression Analyses 1.1</i>						
Step 1: PCI total score	.005		.157***		.126***	
PCI total score		.07		.40***		.35***
Step 2: MPCCI subscale scores	.100***		.072***		.170***	
PCI total score		-.20		.31***		.34***
MPCCI Personal Standards		.41***		-.25***		-.47***
MPCCI Pursuit of Perfection		.10		.13		-.01
MPCCI Concern over Mistakes		-.14		.34***		.45***
<i>Regression Analyses 1.2</i>						
Step 1: PCI factor scores	.100***		.230***		.305***	
PCI F1 (perfectionistic concerns)		-.32***		.42***		.63***
PCI F2 (perfectionistic strivings)		.46***		-.22**		-.45***
PCI F3 (perfectionistic demands)		-.08		.27***		.23***
Step 2: MPCCI subscale scores	.036**		.030**		.060***	
PCI F1 (perfectionistic concerns)		-.34***		.30**		.51***
PCI F2 (perfectionistic strivings)		.19		-.21*		-.33***
PCI F3 (perfectionistic demands)		-.06		.18**		.12
MPCCI Personal Standards		.25**		-.09		-.19*
MPCCI Pursuit of Perfection		.16		.03		-.07
MPCCI Concern over Mistakes		-.08		.27***		.37***
<i>Regression Analyses 2.1</i>						
Step 1: MPCCI total score	.025**		.120***		.077***	
MPCCI total score		.16**		.35***		.28***
Step 2: PCI factor scores	.091***		.118***		.231***	
MPCCI total score		.28*		.19		.12
PCI F1 (perfectionistic concerns)		-.40***		.37***		.60***
PCI F2 (perfectionistic strivings)		.31**		-.33***		-.52***
PCI F3 (perfectionistic demands)		-.11		.24***		.22***

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Regression Analyses 2.2

Step 1: MPCCI subscale scores	.096***	.207***	.269***
MPCCI Personal Standards	.38***	-.20**	-.39***
MPCCI Pursuit of Perfection	.00	.16*	.15*
MPCCI Concern over Mistakes	-.20**	.44***	.56***
Step 2: PCI factor scores	.039**	.052***	.095***
MPCCI Personal Standards	.25**	-.09	-.19*
MPCCI Pursuit of Perfection	.16	.03	-.07
MPCCI Concern over Mistakes	-.08	.27***	.37***
PCI F1 (perfectionistic concerns)	-.34***	.30**	.51***
PCI F2 (perfectionistic strivings)	.19	-.21*	-.33***
PCI F3 (perfectionistic demands)	-.06	.18**	.12

Note. $N = 324$. MPCCI = Multidimensional Perfectionism Cognitions Inventory–English. PCI = Perfectionism Cognitions Inventory; F1, F2, and F3 = factor scores representing Factor 1, 2, and 3 (see Table 1). Note that the ΔR^2 value of Step 2 in the Regression Analyses 2.2 is different from that of Step 2 in the Regression Analyses 1.2, but the standardized regression weights (β s) that the predictors show in Step 2 are identical (cf. Tabachnick & Fidell, 2007).

* $p < .05$. ** $p < .01$. *** $p < .001$.

MULTIDIMENSIONAL ASSESSMENT OF PERFECTIONISM

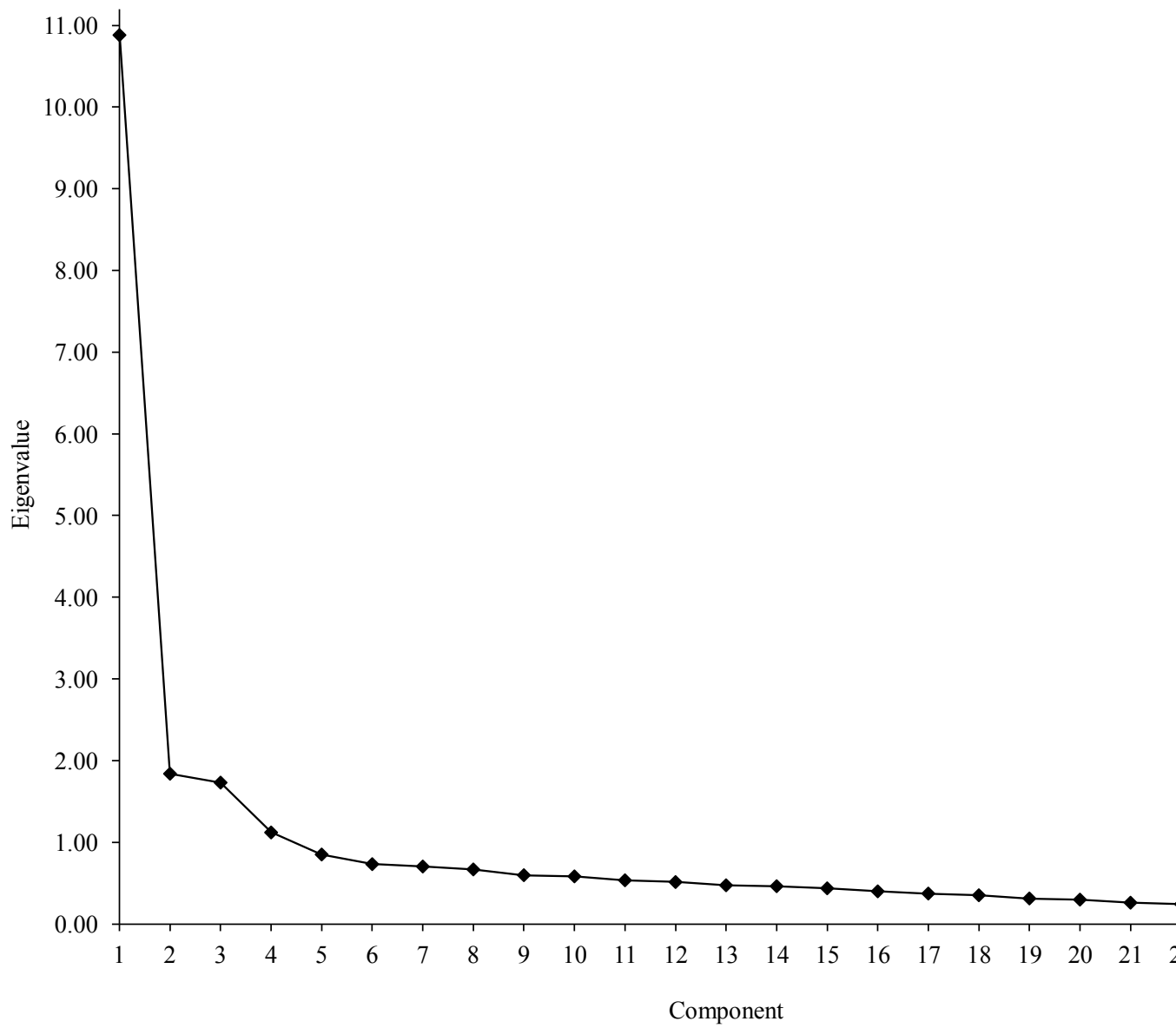


Figure 1. Perfectionism Cognitions Inventory (PCI): Eigenvalue plot.