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The Multidimensional Perfectionism Cognitions Inventory–English (MPCI-E):
Reliability, Validity, and Relationships with Positive and Negative Affect

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Abstract

The Multidimensional Perfectionism Cognitions Inventory (MPCI; Kobori & Tanno, 2004) is a promising new instrument developed in Japan to assess perfectionism cognitions regarding personal standards, pursuit of perfection, and concern over mistakes. The present study examined reliability and validity of the English version of the MPCI, the MPCI-E (Kobori, 2006), in a sample of 371 native English speakers. A confirmatory factor analysis confirmed the MPCI-E's three-factorial oblique structure. Moreover, correlations with measures of dispositional perfectionism and past-week positive and negative affect provided first evidence of the MPCI-E's convergent and differential validity. Finally, hierarchical multiple regressions indicated that the MPCI-E showed incremental validity in explaining variance in positive and negative affect above variance explained by dispositional perfectionism. Overall, the findings provide first evidence for the reliability and validity of the MPCI-E as a multidimensional measure of perfectionism cognitions that has the potential to further our understanding of positive and negative cognitions in perfectionism.

Keywords: perfectionism; cognitions; affect; confirmatory factor analysis; reliability; validity

The Multidimensional Perfectionism Cognitions Inventory–English:

Reliability, Validity, and Relationships with Positive and Negative Affect

According to dictionary definitions, perfectionism is the “disposition to regard anything short of perfection as unacceptable,” with perfection defined as flawlessness or an “unsurpassable degree of accuracy or excellence” (Merriam-Webster, 2009). Scientific theory and research, however, have progressed to a more differentiated view that conceptualizes perfectionism as a multidimensional personality characteristic (e.g., Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; Slaney, Rice, Mobley, Trippi, & Ashby, 2001).

The Multidimensional Perfectionism Cognitions Inventory (MPCI) is a promising new instrument developed at the University of Tokyo, Japan, for assessing the frequency of cognitions associated with dispositional perfectionism along three dimensions: personal standards, pursuit of perfection, and concern over mistakes. Whereas a number of studies have been conducted with the original Japanese version providing empirical support for the factorial, convergent, and differential validity of the MPCI (Kobori, 2006; Kobori & Tanno, 2004, 2005), the validity of the English version, the MPCI-E (Kobori, 2006), has not yet been investigated. Consequently, the aim of the present study was to provide a first investigation of the reliability and validity of the MPCI-E in a large sample of native English speakers. To examine the factorial validity, confirmatory factor analysis was used to test the purported three-dimensional oblique factorial structure. To examine convergent and differential validity, correlations with established measures of dispositional perfectionism and positive and negative affect were examined. Moreover, incremental validity was examined by investigating whether the MPCI-E explained variance in positive and negative affect over and above variance explained by dispositional perfectionism.

Development of the MPCI

The MPCCI was developed to provide for a multidimensional assessment of cognitions associated with self-oriented perfectionism (Kobori, 2006; Kobori & Tanno, 2004). Self-oriented perfectionism is a form of perfectionism that was first described by Hewitt and Flett (1991). It comprises beliefs that striving for perfection and being perfect are important, and is characterized by the setting of excessively high standards for oneself and a need to be perfect. Self-oriented perfectionism is an intrapersonal form of perfectionism: it derives from the self and is directed toward the self. Thus self-oriented perfectionism is primarily internally motivated (Enns & Cox, 2002; Hewitt & Flett, 1991; Stoeber, Feast, & Hayward, 2009). To further understand the nature of self-oriented perfectionism, it is helpful to compare it with socially prescribed perfectionism, another form of perfectionism first described by Hewitt and Flett (1991). Socially prescribed perfectionism comprises beliefs that others have excessively high standards for oneself and that acceptance by others is conditional on fulfilling these high standards. Socially prescribed perfectionism is an interpersonal form of perfectionism: it derives from the individual's perception of others and their expectations. Thus socially prescribed perfectionism is primarily externally motivated (Enns & Cox, 2002; Hewitt & Flett, 1991; Stoeber et al., 2009).

To assess self-oriented and socially prescribed perfectionism, Hewitt and Flett developed the Multidimensional Perfectionism Scale (MPS) which since has become one of most widely used multidimensional measure of dispositional perfectionism (see Web of Science© database, 1970-present). When reviewing the literature on self-oriented perfectionism and socially prescribed perfectionism, Enns and Cox (2002) found that socially prescribed perfectionism clearly represented a negative form of perfectionism showing strong and consistent associations with negative affect and various indicators of psychological maladjustment. Self-oriented perfectionism, in contrast, showed a mixed pattern of associations. On the one hand, self-oriented perfectionism was associated with negative characteristics, processes, and outcomes such

as neuroticism, ruminative brooding, and depression (see Hewitt & Flett, 2004, for a review). On the other hand, it was associated with positive characteristics, processes, and outcomes such as conscientiousness, task-oriented coping, goal attainment, and positive affect (see, e.g., Dunkley & Blankstein, 2000; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; O'Connor, O'Connor, & Marshall, 2007; Powers, Koestner, & Topciu, 2005; Rice, Ashby, & Slaney, 2007).

The MPCCI (Kobori & Tanno, 2004, 2005) was developed to further explore the positive and negative aspects of self-oriented perfectionism. To this aim, the authors constructed an instrument for a multidimensional assessment of perfectionism cognitions that included both positive and negative cognitions. Construction of the MPCCI was inspired by the Perfectionism Cognitions Inventory (PCI; Flett, Hewitt, Blankstein, & Gray, 1998). The PCI is a measure to assess the frequency of perfectionism cognitions comprised of 25 items that capture automatic thoughts typical for perfectionism (e.g., “My goals are very high,” “I should be perfect,” “No matter how much I do, it’s never enough”). Instructions tell respondents that the statements in the questionnaire describe “thoughts about perfectionism that sometimes pop into people’s heads,” and respondents indicate how frequently they experienced these thoughts “over the last week” (Kobori, 2006, p. 24). In contrast, the instructions of dispositional measures of perfectionism like the MPS have instructions telling respondents that the statements in the questionnaire describe “personal characteristics and traits” (Hewitt & Flett, 2004, p. 14), and respondents indicate how much they agree or disagree with each statement. Consequently, the PCI is designed to capture more transient aspects of perfectionism (i.e., perfectionistic cognitions) whereas the MPS is designed to capture perfectionism as a dispositional personality characteristic.

The PCI, however, has an important limitation. Flett et al. (1998; Flett, Hewitt, Whelan, & Martin, 2007) regard the PCI as a one-dimensional measure and thus combine all 25 items to an overall score, regardless of whether they capture personal standards (e.g., “My goals are very

high”), the need to be perfect (“I should be perfect”), or evaluative concerns (“No matter how much I do, it’s never enough”). Research with multidimensional perfectionism measures, however, has demonstrated that it is important to differentiate between personal standards and evaluative concerns (e.g., Frost et al., 1990; Slaney et al., 2001). In particular, it has demonstrated that when personal standards and evaluative concerns are combined to an overall score of perfectionism, this score is associated with higher distress (e.g., Frost et al., 1990; Stöber, 1998). In contrast, when personal standards and evaluative concerns are regarded separately, only evaluative concerns are associated with higher distress and negative affect—whereas personal standards are associated with positive affect (e.g., DiBartolo, Li, & Frost, 2008; Frost et al., 1993).

Against this background, the MPCCI was developed to provide for a multidimensional instrument assessing both positive and negative perfectionism cognitions (Kobori, 2006). A large sample of Japanese undergraduate students responded to an initial pool of items based on case descriptions and discussions on positive and negative aspects of self-oriented perfectionism (e.g., Frost et al., 1990; Hamachek, 1978; Sakurai & Ohtani, 1997; Shafran, Cooper, & Fairburn, 2003). Then, an exploratory factor analysis was conducted extracting three factors (as suggested by the scree test) and using oblique rotation (as the factors were expected to be highly correlated; see Russell, 2002). After deleting items with problematic loadings (i.e., insubstantial loadings, or substantial loadings on more than one factor), the five items with the highest factor loadings were selected, and a confirmatory factor analysis was conducted showing that the hypothesized three-factor oblique model showed an acceptable fit with the data (see Kobori, 2006, for further details). The resulting 15-item inventory was called the Multidimensional Perfectionism Cognitions Inventory (MPCCI) comprising three scales: Personal Standards, capturing cognitions about having perfectionistic standards (5 items); Pursuit of Perfection, capturing cognitions about

the need to be perfect (5 items); and Concern over Mistakes, capturing cognitions about mistakes and associated negative affect (5 items).

Moreover, Kobori (2006) provided for an English version of the MPCCI, the MPCCI-E. The MPCCI-E was translated from the Japanese version using a standard backtranslation procedure (see Brislin, Lonner, & Thorndike, 1973, Chap. 2): a bilingual speaker (born Japanese, who had lived in the USA during her adolescence) translated the inventory into English, the author (O. Kobori) independently translated it back to Japanese, after which discrepancies were discussed between bilingual speaker and author before the final version was agreed. Table 1 shows the scales and items of the MPCCI-E.

Validity Studies with the MPCCI

So far, three studies have been conducted to investigate the convergent and differential validity of the MPCCI. The first of these studies (Kobori, 2006; Kobori & Tanno, 2004) used a sample of undergraduate students who completed the MPCCI, the Perfectionism Cognitions Inventory (Flett et al., 1998), and the Self-Oriented Perfectionism scale from the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991). Moreover, they completed the Automatic Thought Questionnaire (Hollon & Kendall, 1980), measuring the frequency of negative automatic thoughts during the past week, and the Automatic Thought Questionnaire-Positive (Ingram & Wisnicki, 1988), measuring the frequency of positive automatic thoughts during the past week. Correlational analyses showed that all three MPCCI scales displayed significant positive correlations with self-oriented perfectionism and perfectionistic cognitions thus providing first evidence for the scales' convergent validity. However, when regarding positive and negative automatic thoughts, a differential pattern emerged. Whereas Pursuit of Perfection showed positive correlations with both positive and negative automatic thoughts, Personal Standards showed a positive correlation only with positive automatic thoughts and

Concern over Mistakes a positive correlation only with negative automatic thoughts. Thus, as was intended when constructing the MPCCI (Kobori, 2006; Kobori & Tanno, 2004), cognitions relating to perfectionistic personal standards were associated with positive thoughts and cognitions relating to perfectionistic concern over mistakes were associated with negative thoughts.

The other two studies investigating the validity of the MPCCI examined the differential validity of the MPCCI with respect to positive and negative affect (Kobori, 2006; Kobori & Tanno, 2005). Participants completed the Personal Standards and Concern over Mistakes scales of the MPCCI and a measure of positive and negative affect (Ogawa, Monchi, Kikuya, & Suzuki, 2000), based on the Positive Affect Negative Affect Schedule (Watson, Clark, & Tellegen, 1988), that asked participants about their positive and negative affect during the past week. Correlational analyses indicated a differential pattern of relationships for the two MPCCI scales (see Appendix, Studies 2 and 3). Across both studies, Personal Standards showed a positive correlation with positive affect whereas Concern over Mistakes showed a positive correlation with negative affect and a negative correlation with positive affect. Dovetailing the findings of the first study (Kobori, 2006; Kobori & Tanno, 2004), these findings indicate that the Personal Standards scale captures perfectionism cognitions that have a more positive connotation whereas the Concerns over Mistakes scale captures perfectionism cognitions that clearly have negative connotations. Taken together, the findings suggest that the MPCCI may be a useful addition to the assessment of perfectionism by providing scales that separate positive and negative cognitions in perfectionism.

The Present Study

From the studies that so far have been conducted with the MPCCI, however, there remain some open questions. First, all studies have been conducted with the Japanese version of the MPCCI. Consequently, the reliability and validity of the English version, the MPCCI-E (Kobori,

2006), remains to be examined. Second, in the construction of the MPCCI, a confirmatory factor analysis was conducted using the same sample from which the scales were constructed by deleting items that showed problematic loadings in the exploratory factor analysis, so the factorial structure of the MPCCI was not tested in a true a-priori fashion with an independent sample (see, e.g., Brown, 2006). Third, regarding convergent validity, the MPCCI has only been investigated in relation to self-oriented perfectionism, but not in relation to socially prescribed perfectionism. Studies investigating higher-order factors of perfectionism have consistently found that self-oriented perfectionism formed part of a factor that captured positive aspects of perfectionism (labeled “positive striving perfectionism”) whereas socially prescribed perfectionism formed part of a factor that captured negative aspects of perfectionism (labeled “maladaptive evaluation concerns perfectionism;” Frost et al., 1993; see Stoeber & Otto, 2006, for a comprehensive review). Consequently, including socially prescribed perfectionism would be an important addition to the investigation of the MPCCI-E scales’ ability to differentiate between positive and negative aspects of perfectionism.

Finally, from the studies with the MPCCI it remained unclear whether it can be expected that the MPCCI-E would show incremental validity regarding the prediction of positive and negative affect. Research with the MPS (Hewitt & Flett, 1991) found that, like the MPCCI, self-oriented perfectionism and socially prescribed perfectionism show differential relationships with affect. In particular, it has been found that socially prescribed perfectionism usually is associated with higher levels of negative affect and lower levels of positive affect whereas self-oriented perfectionism often is associated with higher levels of positive affect (e.g., Dunkley, Zuroff, & Blankstein, 2006; Frost et al., 1993; Molnar, Reker, Culp, Sadava, & DeCourville, 2006). Because positive and negative affect are central to an individual’s personality, subjective well-being, and psychological health (Diener, Suh, Lucas, & Smith, 1999; Silvia & Warburton, 2006; Watson et al.,

1988), it would be important to investigate how the MPCIE scales compare with self-oriented and socially prescribed perfectionism in the prediction of positive and negative affect. Moreover, the studies investigating how the MPCIE related to affect included only two of the three MPCIE scales: Personal Standards and Concern over Mistakes (Kobori, 2006; Kobori & Tanno, 2005). Consequently, it would be important to investigate how the third scale, Pursuit of Perfection, is related to positive and negative affect when investigating the validity of the MPCIE.

The aim of the present research was to provide a first investigation of the reliability and validity of the English version of the MPCIE, the MPCIE-E, using a large English-speaking sample. First, a confirmatory factor analysis was conducted to investigate the factorial validity with the aim to replicate the original measure's three-factor oblique structure. Second, correlations of the MPCIE-E scales with self-oriented and socially prescribed perfectionism were examined to investigate the scales' convergent and differential validity. Overall, we expected the MPCIE-E to show the same pattern of correlation as the MPCIE (see Appendix, r_{expected}). Moreover, regarding convergent validity, we expected the MPCIE-E scales to show high multiple correlations with both self-oriented perfectionism and socially prescribed perfectionism. Regarding differential validity, we expected the Personal Standards scale to show a higher correlation with self-oriented perfectionism whereas we expected the Concern over Mistakes scale to show a higher correlation with socially prescribed perfectionism. This expectation was based on Frost et al.'s (1993) findings that personal standards and self-oriented perfectionism form part of a "positive striving" dimension whereas concern over mistakes and socially prescribed perfectionism form part of a "maladaptive evaluation concerns" dimension of perfectionism. Finally, the relationships of all three MPCIE scales with positive and negative affect were examined to further explore the differential validity of the scales, and to probe their incremental validity in predicting positive and

negative affect beyond dispositional perfectionism (viz. self-oriented perfectionism and socially prescribed perfectionism).

Method

Participants and Procedure

A sample of 371 students (132 male, 239 female) was recruited at a large British university. Mean age of participants was 20.3 years ($SD = 3.6$; range = 16-49 years). Because studies have found ethnic differences in dispositional perfectionism (e.g., Black students may show higher levels of self-oriented and socially prescribed perfectionism than White students; van Hanswijck de Jonge & Waller, 2003) and in the relationship of positive and negative affect (e.g., Asian students may show less negative correlations between positive and negative affect than White students; Schimmack, Oishi, & Diener, 2002), only White British or Irish students, born and raised in the UK, were recruited.

Ethical approval for the study was obtained from the ethical committee of the first author's department. Participants were recruited in psychology classes and with flyers posted on campus announcing a study on "Perfectionism and Emotional Reactions." Participants completed the measures either individually or in small groups. The order of administration was: first the PANAS, then the MPS, and then the MPCIE (see *Measures* below). In exchange for participation, participants received extra course credit (psychology students) or a participant fee of £3 (approx. US \$4.50). All participants signed an informed consent form¹ and were fully debriefed (being handed a debriefing sheet with information about the study) after completion of the measures.

Measures

Multidimensional Perfectionism Cognitions Inventory–English. The English version of the Multidimensional Perfectionism Cognitions Inventory (MPCIE; Kobori, 2006) was used to assess the frequency of perfectionistic cognitions during the last week. The MPCIE comprises 15

items of which 5 items each measure personal standards, pursuit of perfection and concern over mistakes (see Table 1). The MPCIE uses the same instructions as the PCI (Flett et al., 1998), and items are answered on a 4-point scale with the answer categories 1 = “never,” 2 = “sometimes,” 3 = “frequently,” and 4 = “always.” Scale scores were computed by averaging across items (possible range of scores: 1-4). (See Results and Table 3 for Cronbach’s alphas.)

Multidimensional Perfectionism Scale. The Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1991, 2004) comprises 45 items and was used to assess self-oriented perfectionism (15 items; e.g., “I strive to be as perfect as I can be”) and socially prescribed perfectionism (15 items; e.g., “People expect nothing less than perfection from me”). (The 15 items of the MPS scale measuring other-oriented perfectionism were not included.) The MPS is a widely used measure of dispositional perfectionism and has demonstrated high reliability and validity in numerous studies (see Hewitt & Flett, 2004, for a review). Items were answered on a 7-point scale from 1 = “strongly disagree” to 7 = “strongly agree” (Hewitt & Flett, 2004). Scale scores were computed by averaging across items, allowing for one missing item² (possible range of scores: 1-7). Both scales’ scores showed Cronbach’s alphas > .80 indicating high reliability (internal consistency) (see Table 3).

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (PANAS; Watson & Clark, 1988) was used to assess positive and negative affect. The PANAS is a widely used measure of positive and negative affect and has demonstrated high reliability and validity in numerous studies (e.g., Crawford & Henry, 2004; Watson & Clark, 1988; see Roemer, 2001, for a review). The PANAS comprises 20 items of which 10 measure positive affect (e.g., “proud”) and 10 negative affect (e.g., “guilty”). To conform with the previous validation studies (Kobori, 2006; Kobori & Tanno, 2005) we assessed past-week affect. For this, we presented the PANAS with the time instruction “Week” asking participants to what extent they felt this way during the past

week (see Watson & Clark, 1988, p. 1070). Items were answered on a 5-point scale from 1 = “very slightly or not at all” to 5 = “extremely” (ibid.). Scale scores were computed by averaging across items, allowing for one missing item (possible range of scores: 1-5). Both scales’ scores showed Cronbach’s alphas $> .80$ indicating high reliability (see Table 3).

Preliminary Analyses

Missing data and outliers. When examining the responses to the MPCIE items, we found four participants with missing data (one item missing).³ Moreover, three participants had more than one item missing from the MPS so that no MPS scores were computed for them (see *Measures*). Finally, one participant was identified as a multivariate outlier showing a Mahalanobis distance exceeding the critical value of $\chi^2(15) > 37.70, p < .001$ (see Tabachnick & Fidell, 2007). The eight participants were excluded from all analyses. Consequently, the final sample for the analyses comprised 363 participants (129 male, 234 female) with a mean age of 20.3 years ($SD = 3.7$; range = 16-49 years).

Normality. Before conducting the confirmatory factor analysis to test the purported factorial structure of the MPCIE, we calculated the mean, standard deviation, skewness, and kurtosis for all items to check for deviations from normality. Results showed that eight items displayed significant deviations, with four items displaying significant skewness and another four items significant kurtosis (see Table 1). Consequently, we decided to conduct the confirmatory factor analysis with EQS for Windows, Version 6.1 (Bentler & Wu, 2004) because this program provides for robust maximum likelihood estimation methods that are less sensitive to deviations from normality in the data (Bentler & Bonett, 1980; see also Ullman, 2006).

Results

Confirmatory Factor Analysis

First, we conducted a confirmatory factor analysis on the MPCIE items. Based on the findings with the original MPCIE (Kobori, 2006; Kobori & Tanno, 2004), we tested for a three-factor first-order confirmatory model (consecutively termed three-factor oblique model), that is, a model with three correlated factors in which the five items from each scale were specified to load only on their target factor and all target factors were allowed to correlate (see Table 1). This model was then compared to the null model (no factors, all items uncorrelated) and to the one-factor model (all items forced to load on one factor).

To evaluate model fit, it is generally recommended that multiple measures be considered to capture different aspects of fit (Hoyle & Panter, 1995). Given the well-known problems with the chi-square statistic as a measure of model fit, most notably its extreme sample size sensitivity (Hu & Bentler, 1995; Kaplan, 1990), use of this statistic was restricted to testing the differences between the two nested models (i.e., the one-factor and the three-factor oblique model). Instead, to evaluate model fit, the following robust measures were used: the robust comparative fit index (CFI), the robust Bentler-Bonett non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA) along with its 90% confidence interval (CI). Regarding the CFI and NNFI, larger values indicate better model fit with CFI values above .90 indicating acceptable model fit and values close to .95 good model fit (Hu & Bentler, 1999). By contrast, smaller RMSEA values indicate better model fit, with values below .08 indicating acceptable model fit and values close to .05 good model fit (Hu & Bentler, 1995, 1999; for a discussion of these estimates, see, e.g., Bentler & Bonett, 1980; Browne & Cudeck, 1993).

As Table 2 shows, the fit indices for the hypothesized three-factor oblique model were acceptable to good with both CFI and NNFI close to .95 and RMSEA close to .05 (and the upper limit of the RMSEA's 90% CI below .08). Moreover, the three-factor oblique model showed a markedly better fit than the one-factor model (which did not show an acceptable fit). To compare

the three-factor with the one-factor model, a chi-square difference test was conducted. Because the data were non-normal, the Satorra-Bentler scaled chi-square (S-B χ^2) was computed for both models (Satorra & Bentler, 2001; see Ullman, 2006, for details). The resulting S-B scaled χ^2 difference test was significant with $\chi^2(3, N = 363) = 207.70, p < .001$, indicating that the three-factor oblique model showed a significantly better fit than the one-factor model. Consequently, the three-factor oblique model was accepted as the final model. Table 1 shows the items' loadings on the three oblique factors and the factor correlations. All items displayed substantial loadings on their target factor. Moreover, as was expected, all three factors showed substantial intercorrelations. In line with the findings on the MPCCI (Kobori, 2006; Kobori & Tanno, 2004), the factor representing pursuit of perfection showed high correlations with the factor representing personal standards and the factor representing concern over mistakes, whereas the latter two factors showed a more modest correlation.

Reliability

When scale scores were computed by averaging across items (see Method, Measures), two scales showed a Cronbach's alpha greater than .80 and one scale an alpha approaching .80 (see Table 3). Considering that the scales comprised only five items each and that shorter scales have *ceteris paribus* lower internal consistency than longer scales (Nunnally & Bernstein, 1994), all three scales' scores showed high reliabilities (Cronbach's alphas).

Convergent, Differential, and Incremental Validity

Next we provided for a first examination of the MPCCI-E scales' convergent, differential, and incremental validity. First we examined convergent validity by inspecting the scales' correlations with self-oriented perfectionism and socially prescribed perfectionism. As expected, all scales showed substantial correlations ranging from .31 to .71 (see Table 3). Moreover, a closer inspection of correlations suggested that the scales showed overall higher correlations with self-

oriented perfectionism than with socially prescribed perfectionism. This was confirmed when two multiple regressions were computed, one in which self-oriented perfectionism was regressed on the three MPCIE scales and one in which socially prescribed perfectionism was. Both regressions yielded large multiple correlations ($R = .72$ and $R = .59$, respectively) demonstrating high convergent correlations between MPCIE and MPS scales. Still, the MPCIE scales explained considerably more variance in self-oriented perfectionism ($R^2 = .518, p < .001; f^2 = 1.07$) than in socially prescribed perfectionism ($R^2 = .349, p < .001; f^2 = 0.54$) confirming that the perfectionism cognitions assessed with the MPCIE are more closely related to the construct of self-oriented perfectionism than to that of socially prescribed perfectionism.⁴ Moreover, when testing differences between correlations (Meng, Rosenthal, & Rubin, 1992), results confirmed our expectation that MPCIE Personal Standards would show a larger correlation with self-oriented perfectionism than with socially prescribed perfectionism, $Z = 5.18, p < .001$, but not our expectation that MPCIE Concern over Mistakes would show a larger correlation with socially prescribed perfectionism than with self-oriented perfectionism: the difference was only marginally significant, $Z = 1.90, p = .057$.

Next we examined the MPCIE scales' convergent and divergent validity with respect to past-week positive and negative affect. When correlations between MPCIE scales and past-week positive and negative affect were computed, the scales showed a differential pattern of significant correlations with affect (see Table 3).⁵ Personal standards showed a significant positive correlation with positive affect, whereas Concern over Mistakes showed a significant negative correlation with positive affect and a significant positive correlation with negative affect. Moreover, Pursuit of Perfection showed a positive correlation with negative affect, suggesting that cognitions expressing the need to be perfect (see Pursuit of Perfection items in Table 1) represent negative rather than positive aspects of perfectionism.

To examine to what degree the pattern of correlations that the MPCIE scales showed with self-oriented perfectionism and positive–negative affect was comparable to the pattern that the MPCIE had shown in previous studies, we calculated $r_{\text{alerting-CV}}$ which is the correlation between a pattern of expected correlations and a pattern of empirically obtained correlations (see Westen & Rosenthal, 2003, for details). When we correlated the pattern of expected correlations—calculated from the studies with the MPCIE (Kobori, 2006; Kobori & Tanno, 2005)—with the pattern of correlations obtained in the present study (see Appendix), the resulting $r_{\text{alerting-CV}}$ was .97 indicating a close correspondence between expected and obtained correlations, showing that the MPCIE scales displayed a near-identical pattern of correlations with self-oriented perfectionism and positive–negative affect when compared to the MPCIE scales.

Finally, we examined whether the MPCIE scales would show incremental validity and explain further variance in positive and negative affect beyond the variance already explained by self-oriented and socially prescribed perfectionism. For this, we computed two hierarchical regression analyses: one predicting past-week positive affect, and one predicting past-week negative affect. Following the procedures used by Flett et al. (1998) when examining the incremental validity of the PCI, each regression analysis comprised two steps. In Step 1, self-oriented perfectionism and socially prescribed perfectionism were entered as predictors; and in Step 2, perfectionism cognitions were entered. This way, dispositional perfectionism (self-oriented perfectionism, socially prescribed perfectionism) served as a baseline against which to examine the three MPCIE scales' incremental validity. The results are displayed in Table 4. MPCIE Personal Standards and Concern over Mistakes showed significant regression coefficients in Step 2 making a unique contribution to the prediction of past-week affect, with Personal Standards predicting higher levels of positive affect and Concern over Mistakes predicting higher levels of negative affect and lower levels of positive affect. Thus, when

compared against measures of dispositional perfectionism, the MPCIE demonstrated incremental validity in the prediction of positive and negative affect. Moreover, while the size of these effects was small to moderate only, including the MPCIE scales considerably increased the overall percentage of variance explained in positive and negative affect (see Table 4).

Discussion

The present study provided a first investigation into the reliability and validity of the English version of the Multidimensional Perfectionism Cognitions Inventory (MPCIE) and its three scales: Personal Standards, Pursuit of Perfection, and Concern over Mistakes (Kobori, 2006). As expected from factor analyses with the original Japanese version, the MPCIE (Kobori, 2006; Kobori & Tanno, 2004), the present study's confirmatory factor analysis supported the three-factorial oblique structure, thus providing support for the factorial validity of the MPCIE. When correlations with self-oriented perfectionism and socially prescribed perfectionism were examined, the MPCIE scales displayed convergent validity with measures of dispositional perfectionism. Overall, the MPCIE scales showed higher correlations with self-oriented perfectionism than with socially prescribed perfectionism, except for Concern over Mistakes which showed a higher (albeit only marginally higher) correlation with socially prescribed perfectionism indicating that MPCIE Concern over Mistakes captures maladaptive aspects of perfectionism (Frost et al., 1993; Stoeber & Otto, 2006). When correlations with positive and negative affect were examined, results from the MPCIE scales showed a differential pattern of significant correlations—Personal Standards showing a positive correlation with positive affect, Pursuit of Perfection a positive correlation with negative affect, and Concern over Mistakes a negative correlation with positive affect and a positive correlation with negative affect—suggesting that the MPCIE scales show differential validity. Moreover, the findings provide further evidence for the notion that MPCIE Personal Standards captures positive aspects of

perfectionism (Frost et al., 1993; Stoeber & Otto, 2006). Finally, when pitted against measures of dispositional perfectionism, the MPCIE explained variance in positive and negative affect over and beyond the variance explained by dispositional perfectionism, indicating that the MPCIE scales show incremental validity in the prediction of past-week affect.

The findings have important implications for the assessment of perfectionism. Corroborating previous findings with the PCI (Flett et al., 1998, 2007), the present findings with the MPCIE show that the assessment of perfectionism cognitions and the assessment of dispositional perfectionism are not redundant, but instead complement each other. Consequently, including perfectionism cognitions in the assessment of perfectionism not only will achieve a more comprehensive account of perfectionism, but will also provide for a better understanding of how perfectionism is related to indicators of well-being, psychological adaptation, and distress. Regarding the present findings, perfectionism cognitions predicted variance in positive and negative affect over and beyond variance explained by dispositional perfectionism. The findings demonstrate that it is important to differentiate between positive cognitions and negative cognitions when assessing perfectionism cognitions. Here, the MPCIE has a clear advantage over the PCI because the MPCIE provides for a multidimensional assessment of perfectionism cognitions, providing scales that allow differentiation between positive perfectionism cognitions (Personal Standards), ambivalent perfectionism cognitions (Pursuit of Perfection), and negative perfectionism cognitions (Concern over Mistakes). While negative perfectionism cognitions may be sufficient to explain variance in psychological maladjustment and distress, both negative and positive cognitions seem to be important to understand how perfectionism is related to subjective well-being. As the present findings show, negative perfectionism cognitions predicted negative affect beyond what was predicted by dispositional perfectionism, but both positive and negative perfectionism cognition predicted positive affect.

The present findings have some limitations, however. First, the present sample consisted of White participants only. Consequently, future studies will have to demonstrate that the findings generalize to other ethnic groups. Second, the present study comprised only one point of measurement so we were unable to investigate the stability of the MPCIE scores. For the Japanese version, the MPCIE, Kobori (2006) found that the subscales displayed test-retest correlations between .62 and .69 over an interval of three weeks. Future studies will need to investigate whether the English version shows similar correlations, but should also include longer intervals to examine both short-term and long-term stability. Moreover, these longitudinal studies should also include measures of dispositional perfectionism to investigate, using cross-lagged analyses, to what degree individual differences in dispositional perfectionism are responsible for the stability of perfectionism cognitions over time. Third, the present study focused on self-oriented perfectionism and socially prescribed perfectionism to investigate concurrent and incremental validity of the MPCIE scales. Whereas self-oriented perfectionism and socially prescribed perfectionism (Hewitt & Flett, 1991) are the dimensions of perfectionism that have received the greatest attention in the perfectionism literature and underlie the majority of findings on perfectionism (Web of Science© database, 1970–present), future studies will have to examine how the MPCIE fares when compared to other multidimensional measures of dispositional perfectionism such as the Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990), the revised Almost Perfect Scale (Slaney, Rice, Mobley, Trippi, & Ashby, 2001), the Perfectionism Inventory (Hill et al., 2004), or the Performance Perfectionism Scale (PPS; Chang, 2006). In particular, studies with the FMPS would be informative because the FMPS contains scales that measure facets of dispositional perfectionism that correspond to two of the MPCIE scales, namely personal standards and concern over mistakes (Frost et al., 1990). Thus it can be expected that the MPCIE shows higher convergent validity with the FMPS scales than with self-oriented

perfectionism and socially prescribed perfectionism. Furthermore, studies with the PPS would be informative because the PPS differentiates between positive and negative outcomes from self-oriented and socially prescribed perfectionism (Chang, 2006). Thus studies including the PPS could provide further information to confirm the MPCCI scales' differential validity with respect to positive and negative aspects of perfectionism.

Finally, the present study's finding regarding differential and incremental validity are limited to the investigation of positive and negative affect. Whereas positive and negative affect are central indicators of an individual's personality, subjective well-being, and mental health, future studies should include further positive and negative indicators—such as self-esteem and satisfaction with life on the one hand and psychological symptoms and somatic complaints on the other (see Stoeber & Otto, 2006). Moreover, future studies should go beyond self-report measures and investigate objective performance (e.g., test performance; Stoeber & Kersting, 2007) and include physiological data (e.g., heart rate response to stress; Hewitt, Habke, Lee-Baggley, Sherry, & Flett, 2008) to provide a more comprehensive assessment of the MPCCI-E's convergent, differential, and incremental validity.

Despite these limitations, the present findings represent first evidence indicating that the English version of the MPCCI, the MPCCI-E, is a promising new instrument that provides for a psychometrically strong multidimensional assessment of perfectionism cognitions and thus has the potential to further our understanding of the nature of perfectionism and the cognitions associated with positive and negative forms of perfectionism.

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Footnotes

¹In the UK, parental consent is only required for participants under the age of 16 years (British Psychological Society, 2005).

²In SPSS syntax: COMPUTE scale score = MEAN.x(items) with $x = k-1$ and $k =$ number of items in the scale.

³While EQS for Windows 6.1 provides estimation methods to estimate missing values, these methods require normal distribution of variables (see Preliminary Analyses, Normality). To be able to compute robust statistics, EQS needs a complete set of raw data (Bentler & Wu, 2004; Byrne, 2006).

⁴Because self-oriented perfectionism scores showed a higher reliability (Cronbach's alpha) than self-oriented perfectionism scores, we investigated if the differences were due to the differences in reliability of measurement. However, when we computed structural equation models separating measurement model from structural models (Kline, 2005), the results were the same: the MPCCI scales explained considerably more variance in self-oriented perfectionism ($R^2 = .662, p < .001; f^2 = 1.96$) than in socially prescribed perfectionism ($R^2 = .451, p < .001; f^2 = 0.82$), with f^2 denoting effect size (see Cohen, 1992). Further details can be obtained from the first author upon request.

⁵Before exploring the differences between these correlations, Meng et al.'s test of the heterogeneity of a set of correlated correlations (Meng et al., 1992, Formula 5) was conducted. The test was significant for both positive affect, $\chi^2(2, N = 363) = 44.35$, and negative affect, $\chi^2(2, N = 363) = 29.51$, both $ps < .001$, indicating that the correlations differed significantly.

Table 1

Multidimensional Perfectionism Cognitions Inventory–English (MPCI-E): Scales, Items, Descriptive Statistics, Factor Loadings, Measurement Errors, and Factor Correlations

Scales and items	#	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Three-factor oblique model			
						Factor 1	Factor 2	Factor 3	Error
Personal Standards									
I'm going to aim for the highest standards.	8	2.94	0.83	−0.37	−0.50	.789			.614
It's important to set high standards for myself.	14	3.01	0.85	−0.56***	−0.30	.725			.689
The higher the goal is, the more challenging.	10	2.54	0.89	−0.02	−0.74	.686			.728
It's to my own benefit to set high standards for myself.	5	3.00	0.83	−0.47***	−0.40	.683			.730
The higher my goal, the better.	3	3.02	0.85	−0.49***	−0.49	.659			.752
Pursuit of Perfection									
I can't feel satisfied unless things are done perfectly.	7	1.70	0.78	0.89***	0.22		.739		.673
I must be perfect at any cost.	2	2.25	0.89	0.25	−0.69		.731		.682
I can't be satisfied unless I make it perfect.	1	2.28	0.76	0.22	−0.24		.729		.685
Things shouldn't be imperfect.	13	2.01	0.83	0.34	−0.69		.708		.706
There is meaning in "doing something perfectly."	11	2.44	0.93	−0.01	−0.88***		.673		.739
Concern over Mistakes									
I'll blame myself if I make a mistake.	9	2.42	0.90	0.21	−0.70			.748	.663
If I can't do this well, it means I am below average.	12	2.24	1.04	0.39	−1.02***			.703	.711
It's a shame to make a mistake.	4	2.35	1.02	0.13	−1.11***			.612	.791
I would feel worthless if I fail.	15	2.88	0.86	−0.17	−0.89***			.600	.800
I feel miserable if I make a mistake.	6	2.72	0.86	−0.22	−0.57			.548	.837

(Table 1 continued)

Factor correlations ^a				
Factor 1		1.000		
Factor 2		.725	1.000	
Factor 3		.445	.714	1.000

Note. $N = 363$. Scales and items taken from Kobori (2006). # = item number and position. (The loadings of Items 3, 1, and 4 were fixed to a value of 1.0.) Items are answered on a scale from 1 = “never” to 4 = “always.” Error = measurement error. Errors were assumed to be uncorrelated. Factor loadings are standardized estimates from the confirmatory factor analysis testing the hypothesized three-factor oblique model (see Table 2).

^aAll factor correlations are significant at $p < .001$.

*** $p < .001$.

Table 2
Goodness-of-Fit Indices

Model	<i>df</i>	χ^2	S-B χ^2	CFI	NNFI	RMSEA (90% CI)
Null model	105	2236.29	2111.08	—	—	—
One-factor model	90	579.75	521.27	.785	.749	.115 (.105; .124)
Three-factor oblique model	87	221.05	202.62	.942	.930	.061 (.050; .071)

Note. $N = 363$. *df* = degrees of freedom; S-B χ^2 = Satorra-Bentler chi-square. All fit indices are based on the robust maximum likelihood procedure (Bentler & Wu, 2004): CFI = robust comparative fit index; NNFI = robust non-normed fit index; RMSEA (90% CI) = robust residual mean square error of approximation with 90% confidence interval.

Table 3

MPCI-E, Dispositional Perfectionism, and Past-Week Affect: Descriptive Statistics and Correlations

Variable	<i>M</i>	<i>SD</i>	α	Correlation						
				1	2	3	4	5	6	
MPCI-E										
1. Personal Standards	2.90	0.66	.83							
2. Pursuit of Perfection	2.14	0.65	.84	.62***						
3. Concern over Mistakes	2.52	0.68	.78	.39***	.58***					
Dispositional perfectionism										
4. Self-oriented perfectionism	4.63	1.06	.92	.54***	.71***	.46***				
5. Socially prescribed perfectionism	3.61	0.77	.85	.31***	.51***	.54***	.54***			
Past-week affect										
6. Positive affect	3.10	0.66	.84	.19***	.01	-.13*	.11*	-.10*		
7. Negative affect	2.10	0.72	.84	.09	.14**	.33***	.09	.24***	-.16**	

Note. $N = 363$. MPCI-E = Multidimensional Perfectionism Cognitions Inventory–English. All variables are mean scores on answer scales of 1 = “never” to 4 = “always” (MPCI-E), 1 = “strongly disagree” to 7 = “strongly agree” (dispositional perfectionism), and 1 = “very slightly or not at all” to 5 = “extremely” (past-week affect).

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

Table 4

Summary of Hierarchical Multiple Regressions Predicting Past-Week Affect from Dispositional Perfectionism and MPCIE

Steps and variables	Positive affect					Negative affect				
	<i>B</i>	<i>SE B</i>	β	ΔR^2	<i>f</i> ²	<i>B</i>	<i>SE B</i>	β	ΔR^2	<i>f</i> ²
Step 1: Dispositional perfectionism				.050***	0.05				.058***	0.06
Self-oriented perfectionism	0.15	0.04	.23***			−0.04	0.04	−.06		
Socially prescribed perfectionism	−0.20	0.05	−.23***			0.25	0.06	.27***		
Step 2: MPCIE				.061***	0.06				.068***	0.07
Self-oriented perfectionism	0.13	0.05	.21**			−0.08	0.05	−.11		
Socially prescribed perfectionism	−0.12	0.06	−.14*			0.13	0.06	.14*		
Personal Standards	0.27	0.07	.27***			0.01	0.07	.01		
Pursuit of Perfection	−0.13	0.08	−.13			−0.05	0.09	−.04		
Concern over Mistakes	−0.17	0.06	−.18**			0.35	0.07	.33***		

Note. *N* = 363. MPCIE = Multidimensional Perfectionism Cognitions Inventory–English. ΔR^2 = change in R^2 . *f*² = effect size (see Cohen, 1992). Significance levels for *B* are the same as those for β .

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

Appendix

Correlations Used for Calculating $r_{alerting-CV}$

Correlation	MPCI			$r_{expected}$	MPCI-E $r_{obtained}$
	Study 1 ($N = 198$)	Study 2 ($N = 358$)	Study 3 ($N = 60$)		
$r(\text{Personal Standards, self-oriented perfectionism})$	.51	.45	.25	.45	.54
$r(\text{Concern over Mistakes, self-oriented perfectionism})$	.40	.38	.41	.38	.31
$r(\text{Pursuit of Perfection, self-oriented perfectionism})$	.59	—	—	.59	.71
$r(\text{Personal Standards, positive affect})$	—	.12	.45	.17	.19
$r(\text{Personal Standards, negative affect})$	—	.15	-.01	.13	.09
$r(\text{Concern over Mistakes, positive affect})$	—	-.31	-.30	-.31	-.13
$r(\text{Concern over Mistakes, negative affect})$	—	.32	.47	.34	.33

Note. MPCI = Multidimensional Perfectionism Cognitions Inventory (original Japanese version): Study 1 = Kobori (2006, p. 21, Table 3.1), Study 2 = Kobori & Tanno (2005, Study 1), Study 3 = Kobori & Tanno (2005, Study 2), $r_{expected}$ = average r across the three studies (weighted by N ; computed using Schwarzer's [1991] Meta-Analysis Programs). MPCI-E = Multidimensional Perfectionism Cognitions Inventory-English version: $r_{obtained}$ = correlation obtained in the present study (see Table 3).