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Perfectionism is Adaptive and Maladaptive,

But What's the Combined Effect?

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Abstract

According to the two-factor model of perfectionism, perfectionism is comprised of two higher-order dimensions—perfectionistic strivings (PS) and perfectionistic concerns (PC)—that typically show different, often opposing relationships with adaptive and maladaptive outcomes. Consequently, if we define perfectionism as the combination of PS and PC, it would be important to know what the "combined effect" of perfectionism is, and whether the combined effect is adaptive or maladaptive. Following the 2 × 2 model of perfectionism (Gaudreau & Thompson, 2010), we define the combined effect of perfectionism as the difference between mixed perfectionism (the combination of high PS and high PC) and non-perfectionism (the combination of low PS and low PC). Applying the regression approach for testing the 2 × 2 model (Gaudreau, 2012), we show how the combined effect may be computed, and then illustrate combined effects for different patterns of correlations of PS, PC, and an outcome Y. In addition, we present examples from the research literature where PS and PC show zero, adaptive, and maladaptive combined effects. We conclude the article by discussing how our concept of a combined effect can be extended to perfectionism models with more than two factors, and also address limitations and open questions.

Keywords: perfectionistic strivings; perfectionistic concerns; 2 × 2 model of perfectionism; adaptive outcomes; maladaptive outcomes; combined effect

1. Introduction

Perfectionism is a personality disposition characterized by striving for flawlessness and setting exceedingly high standards of performance accompanied by tendencies for overly critical evaluations of one's behavior (Flett & Hewitt, 2000). Furthermore, perfectionism is best conceptualized as a multidimensional disposition (Hewitt et al., 2003). Whereas different models of perfectionism have suggested different dimensions (e.g., Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991), factor-analytic studies have shown that the models' different dimensions form two higher-order factors (e.g., Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; see also Bieling, Israeli, & Antony, 2004). Originally the two factors were called positive striving perfectionism and maladaptive evaluative concerns perfectionism suggesting that one factor was adaptive and the other maladaptive (Frost et al., 1993). However, whether and to what degree the two factors are adaptive or maladaptive is still an open question. Consequently, the two factors—representing the superordinate dimensions of perfectionism—are nowadays mostly called either personal standards perfectionism and evaluative concerns perfectionism (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000) or perfectionistic strivings and perfectionistic concerns (Stoeber & Otto, 2006).

In the present article, we follow Stoeber and Otto (2006) and call the two dimensions perfectionistic strivings (PS) and perfectionistic concerns (PC). The reason is that we think these terms communicate better that the two dimensions are not different forms of perfectionism (let alone different personality dispositions), but they are different dimensions of one and the same personality disposition called perfectionism (Stoeber, 2018a). PS capture the aspects of perfectionism characterized by exceedingly high personal standards and striving for perfection, and PC capture the aspects characterized by concern over mistakes, fear of others' negative evaluations if not perfect, feelings of discrepancy between one's standards and performance, and negative reactions to imperfection (see Appendix A for a summary table of indicators of PS and PC from different multidimensional perfectionism scales).

Even though PS and PC have shown large-sized positive correlations of up to .70 (Stoeber & Otto, 2006) and in bifactor models emerge as subordinate factors of a dominant general factor representing perfectionism (Smith & Saklofske, 2017), differentiating between PS and PC is important because the two dimensions tend to show different, often opposing relationships with psychological processes and outcomes (both of which we consecutively refer to as "outcomes"). Only PC consistently show positive relationships with "maladaptive outcomes" defined as outcomes that can be considered negative, maladaptive, dysfunctional, or unhealthy (e.g., passive coping, negative affect). By contrast, PS often show positive relationships with "adaptive outcomes" defined as outcomes that can be considered positive, adaptive, functional, or healthy (e.g., active coping, positive affect). The latter relationships are particularly pronounced when the overlap with PC is statistically controlled and the unique effects[1] of PS are examined (Stoeber & Gaudreau, 2017; Stoeber & Otto, 2006). Hence, perfectionism—because it is comprised of PS and PC—can be both adaptive and maladaptive (Bieling et al., 2004).

If perfectionism can be both adaptive and maladaptive (when the PS dimension shows adaptive effects whereas the PC dimension shows maladaptive effects) an important question would be what the "combined effect" of perfectionism is. Why is this an important question? Following Hamachek's (1978) theoretical contribution differentiating normal and neurotic perfectionism, the dual nature of perfectionism has been acknowledged from the very beginning

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[1]In the present article, we use the term "effect" loosely including correlations and predictor–criterion relationships from regression analyses (cf. the use of "effect" in effect size measures; Cohen, 1992).

of research in multidimensional perfectionism (Frost et al., 1993), and since then has been shown across different domains such as academia, health, and sport (e.g., A. Hill, Jowett, & Mallinson-Howard, 2018; Madigan, in press; Sirois & Molnar, 2017). In this regard, research on perfectionism in sport has been particularly prominent in underscoring the view that perfectionism has both adaptive and maladaptive effects (e.g., A. Hill et al., 2018; Jowett, Mallinson, & Hill, 2016). Across studies examining perfectionism in various domains, the findings are that PC consistently show maladaptive effects, sometimes zero effects, but never adaptive effects. By contrast, the pattern of findings regarding the effects of PS is more diverse: Many studies show adaptive effects, but sometimes these effects only emerge when the overlap with PC is statistically controlled. Moreover, there are numerous studies that show maladaptive effects (particularly when the overlap with PC is not controlled) or zero effects. If both perfectionism dimensions show maladaptive effects (or one shows a null effect whereas the other shows a maladaptive effect), it is clear that perfectionism has an overall maladaptive effect. But what if—as is often the case—the PS dimension shows an adaptive effect whereas the PC dimension shows a maladaptive effect? What is the combined effect of PS and PC in these cases: adaptive or maladaptive? Or do the effects cancel each other, and the combined effect is zero?

The latter question was prompted by our studies on the effects of perfectionism on athlete burnout which is a maladaptive outcome that can seriously affect athletes' motivation, performance, and well-being (Madigan, Stoeber, & Passfield, 2015, 2016a, 2016b). Across studies, we found PS and PC to have opposing effects on burnout. PC consistently showed positive relationships with burnout, indicating that PC had maladaptive effects. By contrast, PS consistently showed negative relationships, indicating that PS had adaptive effects. Moreover, this finding replicated earlier findings of opposing effects of PS and PC in research on job burnout and academic burnout (Stoeber & Rennert, 2008; Zhang, Gan, & Cham, 2007) as well as the findings from a meta-analysis on perfectionism and burnout that was published around the same time as our studies (A. Hill & Curran, 2016). If perfectionism is comprised of two dimensions representing PS and PC, and PS show adaptive effects whereas PC show maladaptive effects, what is the combined effect of perfectionism, that is, the effect of PS and PC combined (perfectionism = PS + PC)? And how can we examine this combined effect?

2. How to examine the combined effect of perfectionism

2.1 Overall perfectionism scores

One approach to examine the combined effect of perfectionism could be to compute an "overall perfectionism" score[2] combining PS and PC scores and then determine the correlations of this score with adaptive versus maladaptive outcomes. An example of this approach is provided by Stoeber and Becker (2008) who examined attributions of success and failure—when examining unique relationships partialling out the overlap between PS and PC (cf. Stoeber & Gaudreau, 2017)—and found that PS showed a positive relationship with self-serving attributions (adaptive) whereas PC showed a negative relationship (maladaptive). Consequently, they combined PS and PC scores to capture overall perfectionism. The resulting overall perfectionism scores showed no significant relationship with self-serving attributions, suggesting that the adaptive effect of PS and the maladaptive effect of PC cancelled each other, and perfectionism had overall no effect on self-serving attributions.

The approach of combining PS and PC to an overall perfectionism score, however, is problematic for a number of reasons. First, PS and PC may not contribute to overall perfectionism with equal weight (e.g., when measures of PS and PC have different numbers of items, different response scales, or different variances). Second, the approach does not consider

[2]sometimes also called "total perfectionism" (e.g., Hall, Kerr, & Matthews, 1998)

the unique effects of PS and PC (Stoeber & Gaudreau, 2017) but confounds unique and shared effects of PS and PC giving undue weight to PC because the substantial overlap between the two factors tends to be dominated by PC (Smith & Saklofske, 2017) which may bias overall perfectionism scores towards showing maladaptive effects. Finally, and perhaps most importantly, combining PS and PC to an overall perfectionism score may find perfectionism unrelated to an outcome of interest even when PS and PC individually show significant relationships and, when entered into a regression predicting the outcome, explain significant variance in the outcome (see 3.3).

2.2 Regression approach following the 2 × 2 model of perfectionism

A more appropriate approach is offered by the 2 × 2 model of perfectionism (Gaudreau & Thompson, 2010) and the conceptual and analytic framework it provides. The model differentiates four within-person combinations of PS and PC—non-perfectionism (low PS + low PC), pure PS (high PS + low PC), pure PC (low PS + high PC), and mixed perfectionism (high PS + high PC)—and then, using a regression approach, allows researchers to examine differences between the four combinations (see Gaudreau, 2012, for details). The 2 × 2 model presents a number of hypotheses regarding differences between the four within-person combinations, but the difference between mixed perfectionism and non-perfectionism is not examined (Gaudreau & Thompson, 2010; see also Gaudreau, Franche, Kljajic, & Martinelli, 2018). For the present question regarding the combined effect of perfectionism, however, the difference between mixed perfectionism (high PS + high PC) and non-perfectionism (low PS + low PC) is the critical difference. Because mixed perfectionism combines the unique effects of PS and PC (giving both equal weight while controlling for their overlap), the comparison of mixed perfectionism and non-perfectionism provides an unbiased estimate of the combined effect of perfectionism (defined as PS + PC). Furthermore, this approach provides an estimate of the variance that PS and PC explain in an outcome including the unique effects of PS and PC and their overlap.[3]

How then can we calculate the combined effect of perfectionism following the 2 × 2 model? The answer is to adapt Formulas 1 and 4 from Gaudreau (2012) where the *B*s represent the unstandardized regression weights from a linear regression with Y as the dependent variable (representing the outcome of interest) and PS and PC as predictors. This results in the following two equations:

(1) Y of mixed perfectionism = intercept + (B_{PS} ∗ high PS) + (B_{PC} ∗ high PC)

(2) Y of non-perfectionism = intercept + (B_{PS} ∗ low PS) + (B_{PC} ∗ low PC)

In these equations, high PS refers to a value of 1 *SD* above the mean of PS, high PC to a value of 1 *SD* above the mean of PC, low PS to a value of 1 *SD* below the mean of PS, and low PC to a value of 1 *SD* below the mean of PC (see Gaudreau, 2012, Footnote 4).

The combined effect of perfectionism can then be construed as the difference between mixed perfectionism (high PS + high PC) and non-perfectionism (low PS + low PC); and we calculate the combined effect by first standardizing PS, PC, and Y (M = 0, SD = 1) and then conducting a linear regression analysis with the standardized values of Y as the dependent variable and the standardized values of PS and PC simultaneously entered as predictors. Because of the standardization of PS, PC, and Y, we get (a) an intercept = 0, (b) unstandardized regression weights (*B*s) for PS and PC that are the same as the standardized regression weights,

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[3]Commonality analysis may provide an estimate of the variance attributable to the overlap between PS and PC (Nimon, 2010). This estimate, however, cannot be incorporated into the calculation of the combined effect of PS and PC. As such, our approach provides the closest approximation of the combined effect.

and (c) high PS = 1, high PC = 1, low PS = –1, and low PC = –1. Entering these values into Equations (1) and (2), we then get:

(3) Y of mixed perfectionism = 0 + B_{PS} + B_{PC}

(4) Y of non-perfectionism = 0 – B_{PS} – B_{PC}

The combined effect (CE) of perfectionism can now be construed as the difference between (3) and (4) which, because of the negative signs in Equation (4), simplifies to the following equation:

(5) CE = 2 (B_{PS} + B_{PC})

Because CE values are differences between two means each with *SD* = 1, CE values are comparable to Cohen's *d* values representing effect sizes ($d = [M_A - M_B] / SD$ which simplifies to $d = M_A - M_B$ when *SD* = 1) where absolute *d* values of .20, .50, and .80 are considered small, medium, and large effect sizes (Cohen, 1992). Furthermore, CE values can be tested for significance. One way to do so is by transforming CE values to *r* values using the formula $r = d / \sqrt{(d^2 + 4)}$—which is a formula employed in meta-analyses to transform *d* values to correlations (e.g., Borenstein, Hedges, Higgins, & Rothstein, 2009)—and replacing *d* with CE, and then testing the resulting *r* for significance with *N* = total sample size using the available tables, formulas, or online tools (e.g., https://www.psychometrica.de/effect_size.html#transform and http://vassarstats.net/textbook/ch4apx.html).[4] For simplicity, however, our interpretation of the empirical examples of CEs we present in Sections 3.1 to 3.3 below will focus on effect sizes.

Alternatively, CE values can be computed from the correlations of PS, PC, and Y using the respective equations from statistics text books for computing standardized regression coefficients for two variables predicting a third (e.g., Cohen, Cohen, West, & Aiken, 2003) or using statistic

[4]or use the SPSS syntax in Appendix B

software programs that read in a correlations matrix and compute regressions from the matrix of correlations (see Appendix C for an example of syntax for IBM SPSS®). The latter has the advantage that, if the *N*s for all correlations are available, also the R^2 resulting from the regression (representing the percentage of variance in Y explained by PS and PC) is computed and tested for significance, and the *B*s are tested for significance as well.

3. Combined effects for different constellations of PS, PC, and outcome correlations

To illustrate the usefulness of the 2 × 2 model's regression approach in answering the question of the combined effect of perfectionism, we calculated combined effects for different constellations of *r*(PS, Y), *r*(PC, Y), and *r*(PC, PS). Following Cohen (1992) who considered correlations of .10, .30, and .50 to represent small, medium, and large effect sizes, we calculated combined effect for all possible combinations of .50, .30, .10, .00, –.10, –.30, and –.50 correlations between perfectionism and Y including .70 correlations for *r*(PC, PS) to represent the full range of intercorrelations between PS and PC that have been found in the research literature (cf. Stoeber & Gaudreau, 2017; Stoeber & Otto, 2006). Table 1 shows the combined effects resulting from these calculations as well as the associated R^2 values. For the present question of the adaptiveness versus maladaptiveness of perfectionism, the critical constellations in Table 1 are those where the correlations that PS and PC show with Y have opposing signs.

Focusing on these constellations, there are two patterns in Table 1 that we found noteworthy. The first pattern is straightforward: The combined effect of perfectionism increases with increasing absolute differences between the opposing correlations PS and PC with Y. Correspondingly, perfectionism explains increasing variance with increasing differences. For example, consider the case where PS and PC show an intercorrelation of *r*(PS, PC) = .30. If *r*(PS, Y) = .30 and *r*(PC, Y) = –.10, meaning the absolute difference between the correlations is .40, then the combined effect of perfectionism (CE) is 0.31 and perfectionism explains 13% of the variance in Y. If *r*(PS, Y) = .50 and the absolute difference increases to .60, CE increases to 0.62 and the variance that perfectionism explains increases to 32%.

The second pattern is more complex. Note that the combined effect decreases with increasing positive intercorrelations between PS and PC while the variance explained in Y increases. For example, consider the case where *r*(PS, Y) = .30 and *r*(PC, Y) = –.10. If the intercorrelation is *r*(PC, PY) = .30, CE = 0.31 and perfectionism explains 13% of variance in Y. If the intercorrelation increases to *r*(PS, PC) = .50, CE decreases to 0.27, but the variance that perfectionism explains increases to 17%.

The reason is that the 2 × 2 model's regression approach, used here to assess the combined effect of perfectionism, examines the *unique* effects of PS and PC controlling for the overlap between PS and PC. For any two correlations *r*(PS, Y) and *r*(PC, Y), the unique effects decrease with increasing intercorrelations between PS and PC is, but the size of the R^2—representing the variance that PS and PC together explain in Y—depends on the signs of the correlations *r*(PS, Y) and *r*(PC, Y). If they have the same sign (i.e., the effects of PS and PC go in the same direction), R^2 decreases with increasing intercorrelations between PS and PC. If they have opposing signs (i.e., the effects of PS and PC go in opposing directions), R^2 increases with increasing intercorrelations between PS and PC (see Table 1). The latter effect, which is critical for the present discussion, is due to mutual suppression effects of PS and PC in the prediction of Y that increase the predictive power of PS and PC and the percentage of variance in Y that PS and PC explain. (For a detailed discussion of these suppression effects, see Stoeber & Gaudreau, 2017.)

What combined effects can we differentiate? As the illustrations in Figure 1 show, perfectionism—conceptualized as the difference between mixed perfectionism (high PS + high PC) and non-perfectionism (low PS + low PC)—can have zero combined effects, adaptive combined effects, or maladaptive combined effects. Note that for all illustrations in Figure 1, we assumed that PS have an adaptive effect and PC a maladaptive effect because, for the present discussion, this is the critical pattern of effects. The reason is that, if PS and PC both have adaptive effects (or one has an adaptive effect and the other a zero effect), perfectionism will always have an adaptive combined effect; and if both have maladaptive effects (or one has a maladaptive effect and the other a zero effect), perfectionism will always have a maladaptive combined effect. Consequently, only when PS and PC have opposing effects—PS adaptive and PC maladaptive—does the question of the combined effect and its direction arise.[5]

3.1 Zero combined effects

Perfectionism has a *zero combined effect* if the adaptive effect of PS is of the same size as the maladaptive effect of PC. As Table 1 shows, this is the case for all patterns of correlations where r(PS, Y) has the same size as r(PC, Y) but opposing signs. Panel A shows an illustration of an adaptive outcome (PS have a positive effect, PC a negative effect, and both effects are the same size), and Panel B an illustration of a maladaptive outcome (PS have a negative effect, PC a positive effect, and both effects are the same size). Consequently, the differences between mixed perfectionism (high PS + high PC) and non-perfectionism (low PS + low PC) are zero in both panels.

An empirical example of a zero net effect can be found in a study on perfectionism and well-being (Stoeber & Corr, 2016) regarding positive affect in university students (N = 386). PS (self-oriented perfectionism) and positive affect showed a positive correlation of r = .14, PC (socially prescribed perfectionism) and positive affect showed a negative correlation of r = –.14, and PS and PC showed a positive correlation of r = .47. Because the correlations of PS and PC

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[5]We are not aware of any studies that found the opposite pattern (i.e., PS maladaptive and PC adaptive), but the calculation of the combined effect would also apply to these patterns.

with positive affect were of the same size with opposing signs, the combined effect of perfectionism is zero (CE = 0). Still, PS and PC explained significant variance in positive affect. Putting the study's *N* and correlations into the regression syntax in Appendix C (consecutively referred to as our regression syntax) produced *B*s cancelling each other to zero (B_{PS} = .26 and B_{PC} = –.26, both *p*s < .001) when put into Equation 5 (CE = 0.00), but also produced an $R^2 = .07$, $p < .001$ indicating that PS and PC explained 7% of variance in positive affect. This illustrates that perfectionism may still explain significant variance in an outcome even when the effects of PS and PC cancel each other and perfectionism has a zero combined effect.

3.2 Adaptive combined effects

Perfectionism has an *adaptive combined effect* if the adaptive effect of PS is larger than the maladaptive effect of PC. When inspecting Table 1 and focusing on the constellations where *r*(PS, Y) and *r*(PC, Y) show opposing signs, adaptive combined effects represent cases where Y is an adaptive outcome and *r*(PS, Y) is positive, *r*(PC, Y) is negative, and *r*(PS, Y) is larger than the absolute value of *r*(PC, Y). Further, adaptive combined effects represent cases where Y is a maladaptive outcome and *r*(PS, Y) is negative, *r*(PC, Y) is positive, and the absolute value of *r*(PS, Y) is larger than *r*(PC, Y). Figure 1, Panel C shows an illustration of an adaptive combined effect regarding an adaptive outcome, and Panel D an illustration of an adaptive combined effect regarding a maladaptive outcome.

An empirical example involving an adaptive outcome can be found in a study on perfectionism and academic achievement (Shaunessy, Suldo, & Friedrich, 2011). Examining grade point average (GPA) in *N* = 141 International Baccalaureate students, the study found that PS (high standards) showed a positive correlation of $r = .34$, PC (discrepancy) a negative correlation of $r = –.20$, and PS and PC showed an intercorrelation of $r = .06$. Putting the *N* and the correlations into our regression syntax produced *B*s of $B_{PS} = .35$, $p < .001$ and $B_{PC} = –.22$, $p <$

.01 and a significant $R^2 = .16$, $p < .001$. Entering the *B*s into Equation 5 resulted in a combined effect of CE = 2 (0.13) = 0.26. The finding suggests that perfectionism had a small adaptive combined effect on the students' GPA and explained 16% variance in GPA.

Whereas we had no problems finding empirical examples of adaptive effects involving an adaptive outcome where PS and PC show opposing signs, we had problems finding adaptive effects involving a maladaptive outcome. The best example we could find involving a maladaptive outcome was in a study on perfectionism and procrastination (Uzun Ozer, O'Callaghan, Bokszczanin, Ederer, & Essau, 2014). Examining $N = 403$ undergraduate students, the study found that PS (personal standards) showed a negative correlation of $r = –.26$ with procrastination, PC (doubts about action) showed a positive correlation of $r = .20$, and PS and PC showed an intercorrelation of $r = .20$. Putting the *N* and the correlations into our regression syntax produced *B*s of $B_{PS} = –.31$ and $B_{PC} = .26$, both *p*s < .001 and an $R^2 = .13$, $p < .001$. The combined effect of perfectionism was CE = 2 (–0.05) = –0.10 (Equation 5). The finding suggests that perfectionism had a combined adaptive effect on students' procrastination, but the effect was very small.

3.3 Maladaptive combined effects

Finally, perfectionism has a *maladaptive combined effect* if the adaptive effect of PS is smaller than the maladaptive effect of PC. When inspecting Table 1 and focusing on the constellations where *r*(PS, Y) and *r*(PC, Y) show opposing signs, maladaptive combined effects represent cases where Y is an adaptive outcome and *r*(PS, Y) is positive, *r*(PC, Y) is negative, and *r*(PS, Y) is smaller than the absolute value of *r*(PC, Y). Further, maladaptive combined effects represent cases where Y is a maladaptive outcome and *r*(PS, Y) is negative, *r*(PC, Y) is positive, and the absolute value of *r*(PS, Y) is smaller than *r*(PC, Y). Figure 1, Panel E shows an illustration of a maladaptive combined effect regarding an adaptive outcome, and Panel F an illustration of a maladaptive combined effect regarding a maladaptive outcome.

As an empirical example involving an adaptive outcome, let us return to Stoeber and Becker's (2008) study examining perfectionism and self-serving attributions in female soccer players ($N = 74$). PS (striving for perfection) and self-serving attributions showed a positive correlation of $r = .05$, PC (negative reactions to imperfection) showed a negative correlation of $r = –.24$, and PS and PC showed a correlation of $r = .58$. Putting the N and the correlations into our regression syntax produced *B*s of $B_{PS} = .29$, $p < .05$ and $B_{PC} = –.41$, $p < .01$ resulting in a combined effect of CE = 2 (–0.12) = –0.24 (Equation 5). Unlike the nonsignificant correlation obtained when computing an overall perfectionism score (see 2.2), the regression analysis suggests that perfectionism had a small maladaptive combined effect on self-serving attributions. Furthermore, the analysis produced an $R^2 = .11$, $p < .05$ indicating that PS and PC explained 11% of variance in self-serving attributions, illustrating the superiority of the regression approach over the computation of overall perfectionism scores.

Finally, for an empirical example involving a maladaptive outcome, let us return to burnout and demonstrate that the present regression approach to calculate the combined effect of perfectionism can also be applied to data obtained from meta-analyses. Hence, we examined whether A. Hill and Curran's (2016) meta-analysis of perfectionism and burnout could help us answer the question of what the combined effect of perfectionism on burnout is: adaptive or maladaptive? If we take the weighted mean correlations of PS, PC, and Y = total burnout from their Table 2, we have $r(\text{PS, Y}) = –.14$, $r(\text{PC, Y}) = .41$, and $r(\text{PC, PS}) = .32$. Entering these values into our regression syntax together with the respective *N*s of 8244, 8244, and 8771 produced *B*s of $B_{PS} = –0.30$ and $B_{PC} = 0.51$ resulting in a combined effect of CE = 2 (0.21) = 0.41 and an $R^2 = .25$. (Because of the very large *N*s, all statistics were highly significant, $p < .001$.) The findings suggest that perfectionism explains 25% of variance in burnout and has a nearmedium-sized positive combined effect on burnout and—because burnout is a maladaptive outcome—this represents a maladaptive combined effect. Hence the ultimate answer to our question is: Whereas PS has shown consistent adaptive effects on burnout, perfectionism—understood as the combination of PS and PC—has an overall maladaptive effect on burnout.

4. Discussion: Limitations, Expansions, a Question, and Concluding Comments

4.1 What if there is a significant PS × PC interaction?

However, there is an important caveat to all our above analyses and the calculations of the combined effect presented in this article: If PS and PC show a significant interaction in the prediction of an outcome Y, the combined effect cannot be computed from *r*(PS, Y), *r*(PC, Y), and *r*(PS, PC) using our regression syntax, but only from the original data using moderated regression analyses that include the interaction term followed by simple slope analyses (Aiken & West, 1991; Cohen et al., 2003; see Gaudreau & Thompson, 2010, for empirical examples). The reason is that, if we construe the combined effect of perfectionism as the difference between mixed perfectionism and non-perfectionism, and if there is a significant PS × PC interaction in the prediction of Y, the difference between mixed perfectionism and non-perfectionism does not follow Equation 5 because Gaudreau's (2012) calculations only considered cases of the 2 × 2 model without significant PS × PC interactions.

To illustrate this point let us look at a final empirical example of a study examining perfectionism and emotional reactions in $N = 192$ undergraduate students (Stoeber & Yang, 2010). Regarding satisfaction after perfect achievements, the study found that PS (self-oriented perfectionism) showed a positive correlation of $r = .24$ with satisfaction, PC (socially prescribed perfectionism) showed a zero correlation of r = .00, and PS and PC showed an intercorrelation of $r = .37$. Putting the *N* and the correlations into our regression syntax produced *B*s of $B_{\text{PS}} = 0.28$, $p < .001$ and $B_{\text{PC}} = –0.10$, $p = .175$ resulting in an combined effect of CE = 2 (0.18) = 0.36 and an

$R^2 = .07$, $p < .01$ suggesting that perfectionism had a between small and medium-sized adaptive combined effect and explained 7% in satisfaction. There is, however, a problem: This combined effect does not correspond to the actual difference between mixed perfectionism and non-perfectionism in the study. The reason is that the study also found a significant PS × PC interaction on satisfaction of $B_{PS \times PC} = –0.18$, $p < .01$. Follow-up simple slope analyses showed that there was a difference between high PS and low PS only when PC were low ($B_{PS} = 0.38$, $p < .001$). When PC were high, there was no difference between high PS and low PS ($B_{PS} = 0.02$, $p = .847$). Figure 2 illustrates the effect demonstrating that there was a near-zero difference between mixed perfectionism and non-perfectionism, not the sizeable difference (CE = 0.36) suggested by Equation 5. Furthermore, moderated regression analyses of the original data found that—when the significant PS × PC interaction was included—the model's R^2 was .12, $p < .001$ indicating that perfectionism explained overall 12% in satisfaction which was significantly more than the 7% suggested above. Consequently, it is important to test the interactions of PS and PC (Gaudreau & Thompson, 2010; see also Stoeber, 2018b, and Stoeber & Gaudreau, 2017).

To what degree this caveat presents a serious limitation to the reanalysis of data where only the *N*s and *r*s are available is an open question. The vast majority of published perfectionism research does not report any significant PS × PC interactions which could indicate that these interactions are out of the norm. Whether this is due to researchers' not testing for PS × PC interactions or not reporting these interactions when nonsignificant is unclear. However, we are not aware of any significant PS × PC interactions reported in the research literature that have been replicated in independent studies which puts doubts on the reproducibility of any such interactions (cf. McClelland & Judd, 1993). Still, we would recommend to always report possible interactions as a limitation when using our regression approach with published data that do not report nonsignificant PS × PC interactions.

4.2 What if there are more than two dimensions?

Whereas interaction effects pose a challenge to the present calculations, the fact that the present calculations are based on the two-factor model of perfectionism is not a serious limitation. This is because the calculations can be easily expanded to models with more than two dimensions such as three-dimensional models of perfectionism (e.g., Hewitt & Flett, 1991; Kim, Chen, MacCann, Karlov, & Kleitman, 2015; Smith, Saklofske, Stoeber, & Sherry, 2016). Take, for example, Hewitt and Flett's (1991) model—by far the most widely researched model of the three—differentiating self-oriented perfectionism (SOP), other-oriented perfectionism (OOP), and socially prescribed perfectionism (SPP). A number of studies have found opposing effects of the three dimensions. In a study on perfectionism and employee engagement, for instance, SOP and OOP showed positive effects on engagement whereas SPP showed negative effects (Childs & Stoeber, 2010). To examine the combined effect in this case, mixed perfectionism could be represented by high levels on all three dimensions of perfectionism (high SOP, high OOP, high SPP), and non-perfectionism by low levels on all three dimensions (low SOP, low OOP, low SPP); Equation 5 could then be expanded to CE = 2 ($B_{\mathrm{SOP}} + B_{\mathrm{OOP}} + B_{\mathrm{SPP}}$), with the *B*s calculated from an expansion of the regression syntax in Appendix C to include a further perfectionism dimension as predictor together with the respective *N*s and correlations. Further expansions can be imagined for more-than-three-dimensional models of perfectionism, so the dimensionality of the perfectionism model does not present a challenge to the concept of the combined effect introduced in this article.

4.3 Is this taking us back to a one-dimensional conception of perfectionism?

Finally, there is the question of whether the present approach—suggesting to compute the combined effect of different perfectionism dimensions—is taking us back to the 1980s when perfectionism was conceptualized as a one-dimensional disposition and perfectionism measures did not differentiate any dimensions (e.g., Burns, 1980; Garner, Olmstead, & Polivy, 1983; see Stoeber, 2018a, for a review). We think that this is not the case. On the contrary, unlike approaches that combine PS and PC scores to an “overall perfectionism score” (see 2.1), the approach we propose in this article preserves the conception of perfectionism as multidimensional. Not only is our approach based on a multidimensional model of perfectionism, the 2 × 2 model of perfectionism (Gaudreau & Thompson, 2010), but keeping PS and PC as separate dimensions of perfectionism is central to the definition of the combined effect (cf. Equations 1-5). Our approach does not suggest to combine different dimensions of perfectionism to one dimension of perfectionism, but to examine the combined effect of different dimensions of perfectionism.

4.4 Concluding comments

Perfectionism has been described as a “double-edged sword” (Molnar, Reker, Culp, Sadava, & DeCourville, 2006; Stoeber, 2014). The reason is that perfectionism is a personality disposition comprised of different dimensions that often have different, sometimes opposing, effects in relation to adaptive and maladaptive psychological processes and outcomes. However, our impression when reviewing the research literature (including reviews and meta-analyses) for the present article focusing on the two-factor model was that—when perfectionistic strivings had adaptive effects—these effects tended to be smaller than the maladaptive effects of perfectionistic concerns. If so, this would suggest that for most processes and outcomes of interest, perfectionism has a combined maladaptive effect, indicating that the maladaptive edge of the perfectionism sword may be sharper and cut deeper. Moreover, we noted that adaptive and maladaptive effects often appeared to cancel each other. As regards the empirical examples we presented, all combined effects were rather small and statistically nonsignificant (with the exception of the combined effect calculated from Curran and Hill’s meta-analysis of perfectionism and burnout). However, note that even small effects can be meaningful if they represent effects that may cumulate over time (Prentice & Miller, 1992). Moreover, note that there may be exceptions in either direction, as well as processes and outcomes where perfectionism has an overall adaptive effect (e.g., academic achievement; Madigan, in press). What the exceptions are, and whether they suggest that perfectionism is overall adaptive or maladaptive, has not yet been systematically investigated. We hope that the present article will stimulate such investigations.

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Table 1

Combined Effect (CE) and Explained Variance (R^2) for Different Constellations of Correlations Between Perfectionistic Strivings (PS), Perfectionistic Concerns (PC), and an Outcome Y

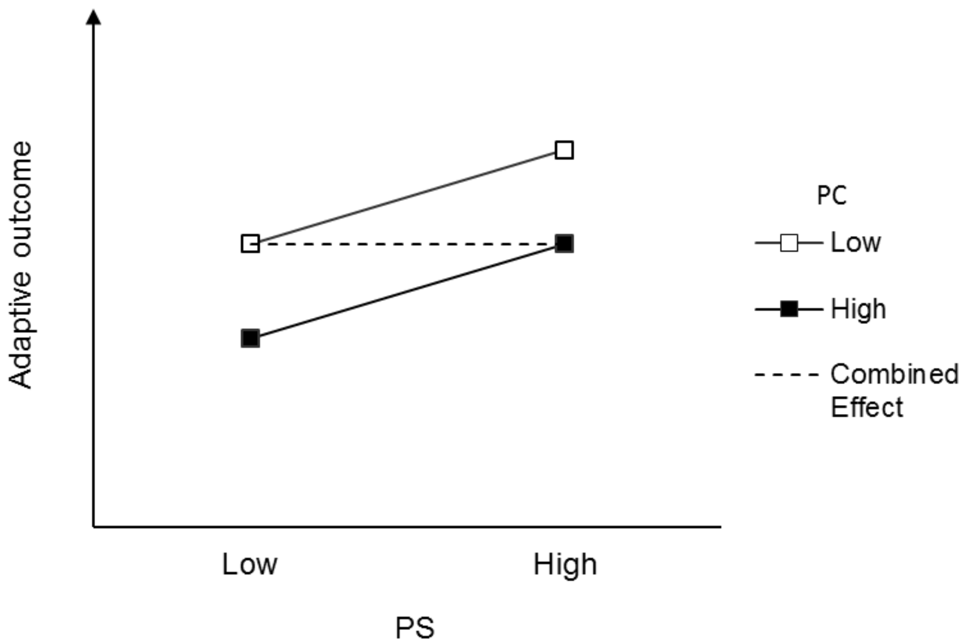
		r(PS, PC)									
		.00		.10		.30		.50		.70	
r(PS, Y)	*r*(PC, Y)	CE	R^2	CE	R^2	CE	R^2	CE	R^2	CE	R^2
.50	.50	2.00	.50	1.82	.45	1.54	.38	1.33	.33	1.18	.29
	.30	1.60	.34	1.45	.31	1.23	.27	1.07	.25	0.94	.25
	.10	1.20	.26	1.09	.25	0.92	.25	0.80	.28	0.71	.37
	.00	1.00	.25	0.91	.25	0.77	.27	0.67	.33	0.59	.49
	–.10	0.80	.26	0.73	.27	0.62	.32	0.53	.41	—	—
	–.30	0.40	.34	0.36	.37	0.31	.47	0.27	.65	—	—
	–.50	0.00	.50	0.00	.56	0.00	.71	0.00	1.00	—	—
.30	.50	1.60	.34	1.45	.31	1.23	.27	1.07	.25	0.94	.25
	.30	1.20	.18	1.09	.16	0.92	.14	0.80	.12	0.71	.11
	.10	0.80	.10	0.73	.09	0.62	.09	0.53	.09	0.47	.11
	.00	0.60	.09	0.55	.09	0.46	.10	0.40	.12	0.35	.18
	–.10	0.40	.10	0.36	.11	0.31	.13	0.27	.17	0.24	.28
	–.30	0.00	.18	0.00	.20	0.00	.26	0.00	.36	0.00	.60

	–.50	–.40	.34	–0.36	.37	–0.31	.47	–0.27	.65	—	—
.10	.50	1.20	.26	1.09	.25	0.92	.25	0.80	.28	0.71	.37
	.30	0.80	.10	0.73	.09	0.62	.09	0.53	.09	0.47	.11
	.10	0.40	.02	0.36	.02	0.31	.02	0.27	.01	0.24	.01
	.00	0.20	.01	0.18	.01	0.15	.01	0.13	.01	0.12	.02
	–.10	0.00	.02	0.00	.02	0.00	.03	0.00	.04	0.00	.07
	–.30	–0.40	.10	–0.36	.11	–0.31	.13	–0.27	.17	–0.24	.28
	–.50	–0.80	.26	–0.73	.27	–0.62	.32	–0.53	.41	—	—
.00	.50	1.00	.25	0.91	.25	0.77	.27	0.67	.33	0.59	.49
	.30	0.60	.09	0.55	.09	0.46	.10	0.40	.12	0.35	.18
	.10	0.20	.01	0.18	.01	0.15	.01	0.13	.01	0.12	.02
	.00	0.00	.00	0.00	.00	0.00	.00	0.00	.00	0.00	.00
	–.10	–0.20	.01	–0.18	.01	–0.15	.01	–0.13	.01	–0.12	.02
	–.30	–0.60	.09	–0.55	.09	–0.46	.10	–0.40	.12	–0.35	.18
	–.50	–1.00	.25	–0.91	.25	–0.77	.27	–0.67	.33	–0.59	.49
–.10	.50	0.80	.26	0.73	.27	0.62	.32	0.53	.41	—	—
	.30	0.40	.10	0.36	.11	0.31	.13	0.27	.17	0.24	.28
	.10	0.00	.02	0.00	.02	0.00	.03	0.00	.04	0.00	.07
	.00	–0.20	.01	–0.18	.01	–0.15	.01	–0.13	.01	–0.12	.02
	–.10	–0.40	.02	–0.36	.02	–0.31	.02	–0.27	.01	–0.24	.01

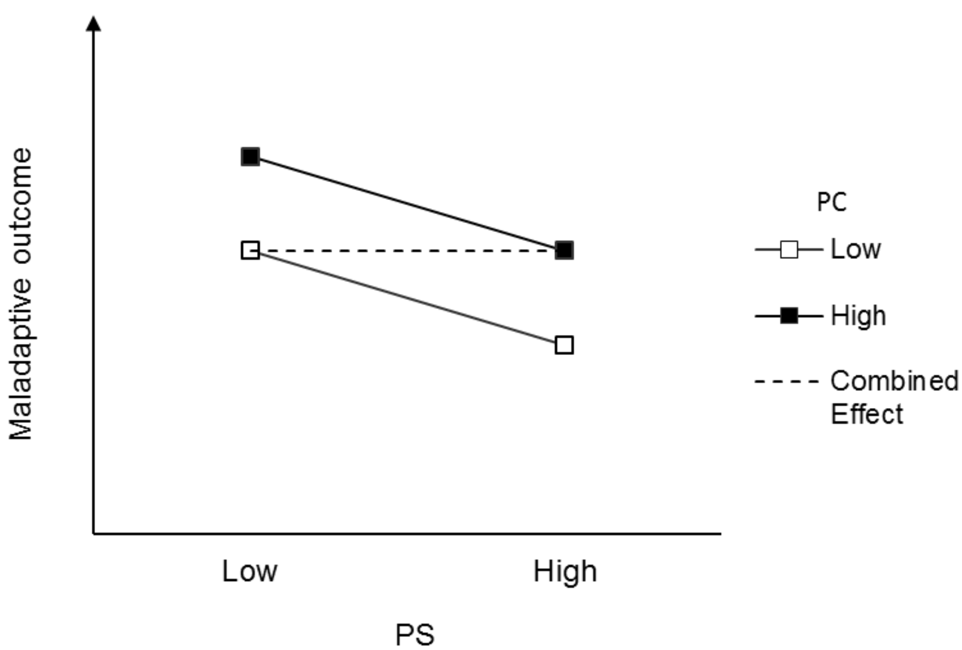
	–.30	–0.80	.10	–0.73	.09	–0.62	.09	–0.53	.09	–0.47	.11
	–.50	–1.20	.26	–1.09	.25	–0.92	.25	–0.80	.28	–0.71	.37
–.30	.50	0.40	.34	0.36	.37	0.31	.47	0.27	.65	—	—
	.30	0.00	.18	0.00	.20	0.00	.26	0.00	.36	0.00	.60
	.10	–0.40	.10	–0.36	.11	–0.31	.13	–0.27	.17	–0.24	.28
	.00	–0.60	.09	–0.55	.09	–0.46	.10	–0.40	.12	–0.35	.18
	–.10	–0.80	.10	–0.73	.09	–0.62	.09	–0.53	.09	–0.47	.11
	–.30	–1.20	.18	–1.09	.16	–0.92	.14	–0.80	.12	–0.71	.11
	–.50	–1.60	.34	–1.45	.31	–1.23	.27	–1.07	.25	–0.94	.25
–.50	.50	0.00	.50	0.00	.56	0.00	.71	0.00	1.00	—	—
	.30	–0.40	.34	–0.36	.37	–0.31	.47	–0.27	.65	—	—
	.10	–0.80	.26	–0.73	.27	–0.62	.32	–0.53	.41	—	—
	.00	–1.00	.25	–0.91	.25	–0.77	.27	–0.67	.33	–0.59	.49
	–.10	–1.20	.26	–1.09	.25	–0.92	.25	–0.80	.28	–0.71	.37
	–.30	–1.60	.34	–1.45	.31	–1.23	.27	–1.07	.25	–0.94	.25
	–.50	–2.00	.50	–1.82	.45	–1.54	.38	–1.33	.33	–1.18	.29

Note. CE values can be interpreted as Cohen's *d* (see 2.2). *r* = bivariate correlation; $R^2 * 100$ = percentage of variance in Y explained by PS and PC (multiple regression with PS and PC predicting Y; see Appendix C); — = not applicable because the combination of *r*(PS, Y), *r*(PC, Y), and *r*(PS, PC) is not possible.

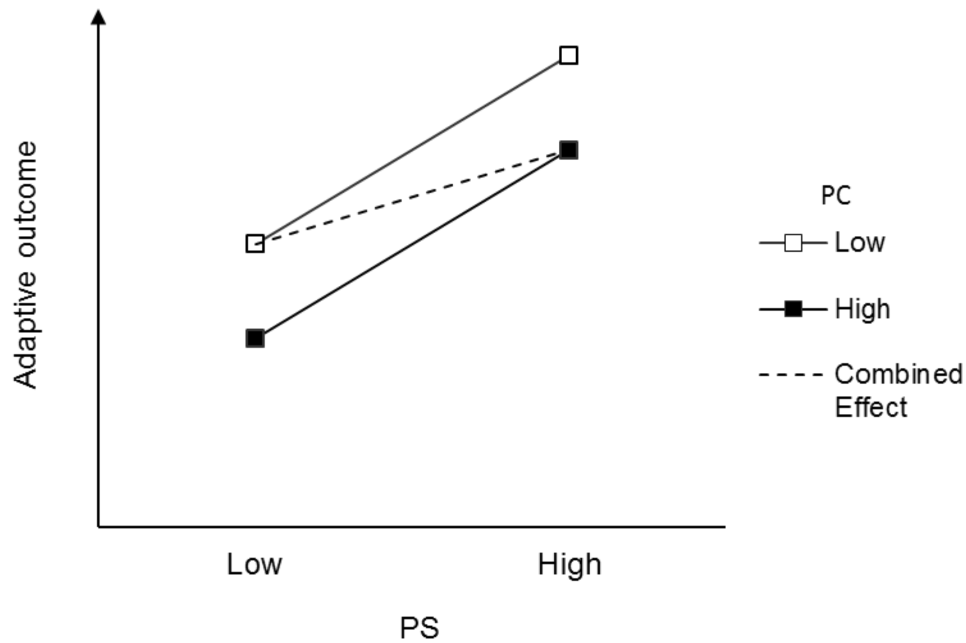
A


Adaptive outcome
PC
Low
High
Combined Effect
Low
High
PS

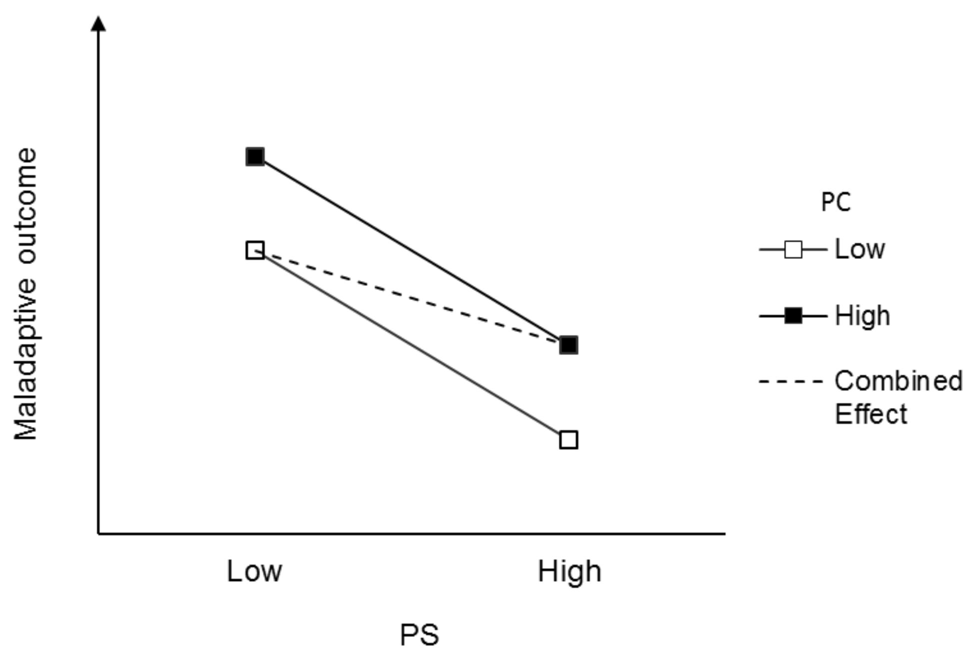
B


Maladaptive outcome
PC
Low
High
Combined Effect
Low
High
PS

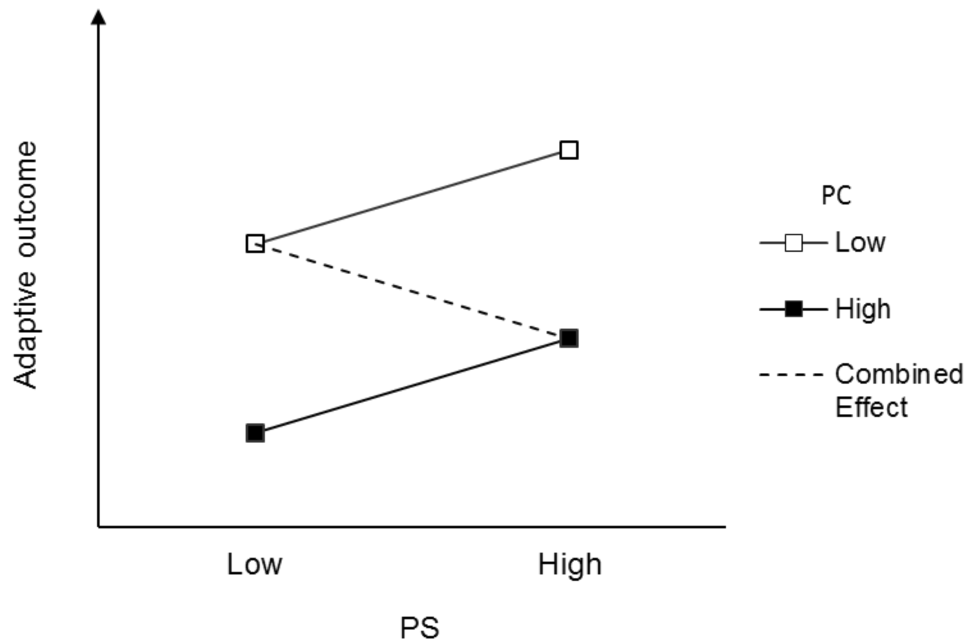
C


Adaptive outcome
PC
Low
High
Combined Effect
Low
High
PS

D


Maladaptive outcome
PC
Low
High
Combined Effect
Low
High
PS

E


Adaptive outcome
PC
Low
High
Combined
Effect
Low
High
PS

F

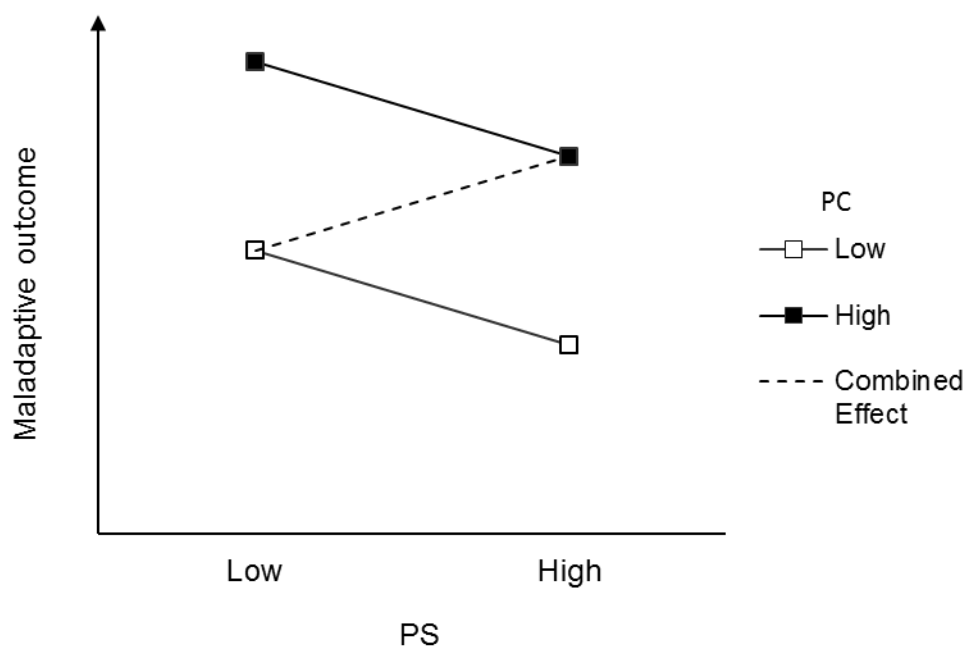

Maladaptive outcome
PC
Low
High
Combined
Effect
Low
High
PS

Figure 1. Illustrations of zero combined effects (Panels A and B), adaptive combined effects (C and D), and maladaptive combined effects (E and F) of perfectionism for adaptive outcomes (A, C, and E) and maladaptive outcomes (B, D, and F) when perfectionistic strivings (PS) and perfectionistic concerns (PC) have opposing effects such that PS have an adaptive and PS a maladaptive effect. Following the 2 × 2 model of perfectionism, the combined effect of perfectionism is the difference between mixed perfectionism (represented by the combination of high PS and high PC) and non-perfectionism (represented by the combination of low PS and low PC).

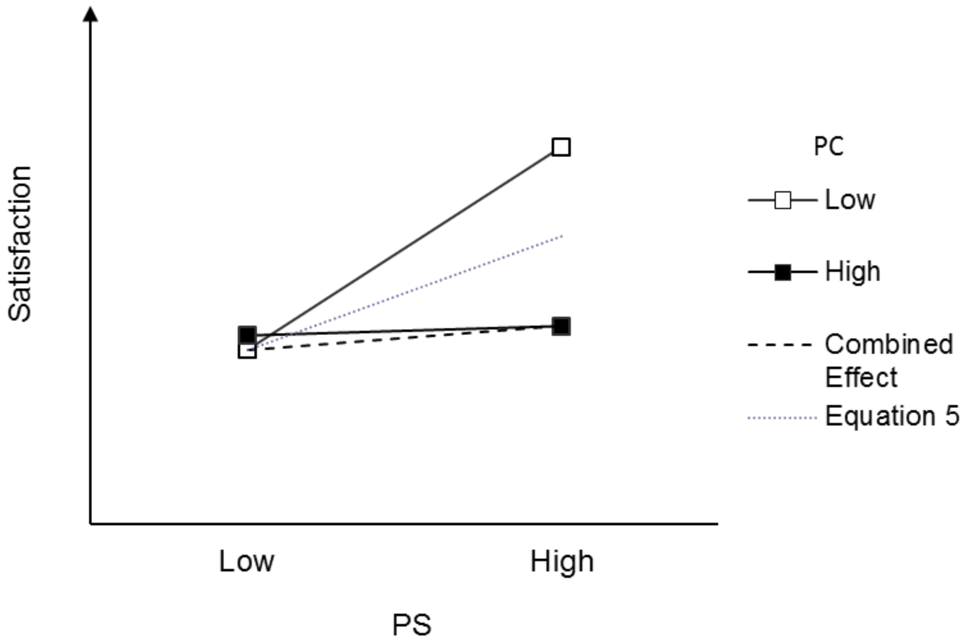


Figure 2. Illustration of how a significant PS × PC interaction dissociates the combined effect representing the actual difference between mixed perfectionism and non-perfectionism from the combined effect calculated using Equation 5 (adapted from Stoeber & Yang, 2010, Figure 1, Panel A).

Appendix A

Indicators of Perfectionistic Strivings and Perfectionistic Concerns: Examples

Scale	Perfectionistic strivings	Perfectionistic concerns
FMPS	Personal standards	Concern over mistakes
	Pure personal standards[a]	Concern over mistakes + doubts about actions[b]
HF-MPS	Self-oriented perfectionism[c]	Socially prescribed perfectionism
APS-R	High standards	Discrepancy
PI	Striving for excellence	Concern over mistakes
MIPS	Striving for perfection	Negative reactions to imperfection

Note. Table reproduced from Stoeber and Gaudreau (2017, p. 380). Scales are listed in chronological order of their first publication. FMPS = Frost Multidimensional Perfectionism Scale (Frost et al., 1990); HF-MPS = Hewitt-Flett Multidimensional Perfectionism Scale (Hewitt & Flett, 1991, 2004); APS-R = revised Almost Perfect Scale (Slaney, Rice, Mobley, Trippi, & Ashby, 2001); PI = Perfectionism Inventory (R. Hill et al., 2004); MIPS = Multidimensional Inventory of Perfectionism in Sport (Stoeber, Otto, Pescheck, Becker, & Stoll, 2007).

[a]See DiBartolo, Frost, Chang, LaSoto, and Grills (2004).

[b]See Stöber (1998).

[c]particularly the subscale capturing striving for perfection (cf. Stoeber & Childs, 2010)

Appendix B

```
DATA LIST FREE/CE N.
BEGIN DATA
0.50 100
END DATA.

COMPUTE r = CE/SQRT((CE**2)+4).

COMPUTE t = r*SQRT((N-2)/(1-r**2)).
COMPUTE df = N-2.
IF (r > 0) p = 2*(1-CDF.T(t,df)).
IF (r < 0) p = 2*CDF.T(t,df).

FORMATS N df (F6).

EXECUTE.

*See resulting data file for p value.
```

IBM SPSS® syntax template computing a significance test of CE for a fictitious case where CE = 0.50 and $N = 100$ using the formula from Borenstein et al. (2009) replacing d with CE (see 2.2) and the SPSS template for computing the significance of a correlation from Sigma Plus Statistiek (2019). (See Supplementary Material for how to compute 95% confidence intervals and an R script.)

Appendix C

```
MATRIX DATA VARIABLES = ROWTYPE_ Y PS PC
  /FORMAT = LOWER DIAGONAL.
BEGIN DATA.
MEAN 0 0 0
STDDEV 1 1 1
N 100 100 100
CORR 1.00
CORR  .10 1.00
CORR -.20  .30 1.00
END DATA.

REGRESSION MATRIX = IN(*)
  /DEPENDENT = Y
  /ENTER = PS PC.
```

IBM SPSS® syntax template computing a regression for a fictitious data set where r(PS, Y) = .10, r(PC, Y) = –.20, and r(PS, PC) = .30 and all correlations have an N of 100. (See Supplementary Material for an R script.)

IBM SPSS® Syntax Computing 95% Confidence Intervals for CE = 0.50 and *N* = 100 (see Appendix B)

```
DATA LIST FREE/CE N CONF.
BEGIN DATA
0.50 100 .95
END DATA.

*Convert CE to r (see Appendix 2):

COMPUTE r = CE / SQRT((CE**2)+4).

*Fisher z-transformation for correlation:

COMPUTE #Zr = 0.5 * LN((1+r)/(1-r)).

*Find z-transformed lower and upper boundaries:

COMPUTE #Z = IDF.NORMAL(1 - 0.5 * (1-CONF),0,1).
COMPUTE #LZ = #Zr - (N-3)**-0.5 * #Z.
COMPUTE #UZ = #Zr + (N-3)**-0.5 * #Z.

*Convert lower z-boundary back to correlation:

COMPUTE lower_bound = 0.
COMPUTE #E_Z=#LZ.
COMPUTE #FX_VAL=1.
COMPUTE #THRESHOLD = 0.00000001.
LOOP IF (ABS(#FX_VAL) > #THRESHOLD).
COMPUTE lower_bound = lower_bound - (.5 * LN((lower_bound+1)/(1-
lower_bound)) + lower_bound /(2*(N-1)) - #E_Z) /(-1/
(lower_bound*lower_bound -1) + 1/(2*(N-1)) ).
IF (lower_bound <= -1) lower_bound= -.999999999.
IF (lower_bound >=  1) lower_bound=  .999999999.
COMPUTE #FX_VAL=.5 * LN((lower_bound+1)/(1-lower_bound))
+lower_bound/(2*(N-1)) - #E_Z.
END LOOP.

*Convert upper z-boundary back to correlation:

COMPUTE upper_bound = 0.
COMPUTE #E_Z=#UZ.
COMPUTE #FX_VAL=1.
COMPUTE #THRESHOLD = 0.00000001.
LOOP IF (ABS(#FX_VAL) > #THRESHOLD).
COMPUTE upper_bound = upper_bound - (.5 * LN((upper_bound+1)/(1-
upper_bound)) + upper_bound /(2*(N-1)) - #E_Z) /(-1/
```

```
(upper_bound*upper_bound -1) + 1/(2*(N-1))).
IF (upper_bound <= -1) upper_bound= -.999999999.
IF (upper_bound >=  1) upper_bound=  .999999999.
COMPUTE #FX_VAL=.5 * LN((upper_bound+1)/(1-upper_bound))
+upper_bound/(2*(N-1)) - #E_Z.
END LOOP.

*Apply labels and formats:

VARIABLE LABELS lower_bound "Lower bound for confidence
interval".
VARIABLE LABELS upper_bound "Upper bound for confidence
interval".
FORMATS N (F6).
EXECUTE.
```

Note. Syntax adapted from Sigma Plus Statistiek (2019).

R Script for Appendix B Including the Computation of 95% Confidence Intervals for CE = 0.50 and *N* = 100 (see IBM SPSS® Syntax Above)

```
# Install package with function
# If package is already installed
# then omit next line using '#'

install.packages("psychometric")

# load required packages (psychometric)

library(psychometric)

# Set value for CE
# Set value for sample size N
# Set value for confidence interval CONF

CE   <- 0.50
N    <- 100
CONF <- .95

# Calculate r from CE

rvalue <- (CE / sqrt((CE^2)+4))
tvalue <- ((rvalue)*sqrt(N-2))/(sqrt(1-rvalue^2))
df <- N-2
pvalue <- 2*pt(abs(tvalue), df, lower.tail = FALSE)
```

```
# Report r, t, and p value

rvalue
tvalue
pvalue

# The following command calculates lower and upper
# 95% confidence interval boundaries
# using the predefined values for CE, N, and CONF
# for the correlation corresponding to CE (rvalue)

CIr(rvalue, N , CONF)
```

R Script for Appendix C

```
# Y = DV (dependent variable)
# PS, PC = predictors (k: 2 predictors)
# N = 100

N <- 100
k <-2

# Define correlation matrix

cor_matrix =
  matrix(
    c(
      1.00, 0.10, -0.20,
      0.10, 1.00,  0.30,
     -0.20, 0.30,  1.00
    ), nrow = 3, ncol = 3,
    dimnames = list(
      c("Y", "PS", "PC"),
      c("Y", "PS", "PC")
    ))

# Convert correlation matrix to covariance matrix for lavaan

library(lavaan)
sd_vector = c(1,1,1)
mean_vector = c(0,0,0)
cov_matrix = lavaan::cor2cov(cor_matrix, sd_vector)

# Fit the model

fit <- sem( "Y ~ PS + PC",
```

```
           sample.cov = cov_matrix,
           sample.nobs = N,
           meanstructure = TRUE,
           sample.mean = mean_vector)

# Get Rsquare

inspect(fit, "r2")
R2 <-inspect(fit, "r2")

# Get F statistic and p value

fvalue <-((R2)*(N-k-1))/((1-R2)*(k))
cat("F = ", fvalue)
pvalue <- pf(fvalue, k, N-k-1, lower.tail = FALSE)
cat("p = ", pvalue)

# Look at the regression

summary(fit, standardize = TRUE, rsquare = TRUE)
```