



A test of the 2 × 2 model of perfectionism with perceived distress, cognitive emotion regulation, and perfectionist cognitions

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Abstract

Based on within-person combinations of self-oriented perfectionism (SOP) and socially prescribed perfectionism (SPP), the 2 × 2 model asserts four personality subtypes: Non-Perfectionism, Pure SOP, Pure SPP, and Mixed Perfectionism. We tested whether these subtypes can be distinctively associated with perceived distress, cognitive emotion regulation (CER) strategies, and perfectionist cognitions. Results of multiple regressions with 213 adults (72.8% female, $M = 34.07$, $SD = 12.04$ years old) revealed that Pure SOP (compared with Non-Perfectionism) and Mixed Perfectionism (compared with Pure SPP) perceived similar levels of distress but reported more perfectionist cognitions and both adaptive and maladaptive CER strategies. The two subtypes associated with high SPP reported less adaptive CER strategies than the Pure SOP and Non-Perfectionism. The presence of the SOP facet did not mitigate the detrimental effects of the SPP facet on negative outcomes. On the contrary, the SOP facet seems to have a positive influence on the adoption of adaptive CER strategies and helps attenuate the detrimental effects of the SPP. Studies about the 2 × 2 model of perfectionism should focus on comparing the predicted values between each subtype of perfectionism.

Keywords Cognitive emotion regulation · Perceived distress · Perfectionism · Perfectionist cognitions

Introduction

Perfectionism is a complex, multidimensional, transdiagnostic personality trait associated both with adaptive and maladaptive characteristics, processes, and outcomes (Gaudreau et al., 2018; Macedo et al., 2014; Stoeber & Stoeber, 2009). Despite its adaptive characteristics, research on perfectionism has been largely focused on distress and negative psychological outcomes (e.g., Gaudreau et al.,

2018; Hewitt & Flett, 1993, 2002; Macedo et al., 2014). Perfectionist cognitions and cognitive emotion regulation are two relevant mechanisms that seem to contribute significantly to the maladaptive effects of perfectionism (Castro et al., 2017; Macedo et al., 2017; Rudolph et al., 2007).

Perfectionist cognitions are automatic thoughts about the need to be perfect and the inability to achieve perfection (Flett et al., 1998). On the other hand, cognitive emotion regulation (CER) is a conscious mental process that helps individuals maintain emotional control during or after stressful events (Garnefski et al., 2001). According to the literature (e.g., Dunkley et al., 2003; Macedo et al., 2014; Rudolph et al., 2007), the usual tendency of perfectionist individuals to present automatic thoughts about perfection and to adopt frequent maladaptive CER strategies (e.g., self-blame and rumination) worsens psychological adjustment and contributes to the persistence of stress. Considering that perfectionism appears to be increasing in the general population (Curran & Hill, 2017), it is particularly relevant to deepen and clarify how perfectionism dimensions relate to perceived distress and the role of perfectionist cognitions and CER in this relationship.

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The 2×2 model of perfectionism (Gaudreau & Thompson, 2010) provides a promising and comprehensive background to study this topic due to both its theoretical characteristics, compared to other models that assume perfectionism as a multidimensional construct (e.g., Hewitt & Flett, 1991; Stoeber & Otto, 2006), and to its empirical support (e.g., Gaudreau, 2012; Kljajic et al., 2017; Waleriańczyk & Stolarski, 2022). Indeed, the 2×2 model of dispositional perfectionism is an open theoretical framework that approaches the nuances of perfectionism through the combination of its intrapersonal and interpersonal components, which are present in every individual, resulting in the identification of four perfectionism subtypes (Gaudreau & Thompson, 2010; Gaudreau, 2012).

Conceptualization of perfectionism

Perfectionism is a personality trait composed of two central facets theorized in the multidimensional theory of Hewitt and Flett (1991): Self-Oriented Perfectionism (SOP) and Socially Prescribed Perfectionism (SPP). SOP is an intrapersonal facet that reflects a self-imposed tendency to establish excessively high-performance standards and a severe self-evaluation focused on errors or failures. The SPP considers the interpersonal motives of perfectionism, representing a tendency to strive for perfection to gain approval from significant others, seen as excessively demanding (Hewitt & Flett, 1991). Although perfectionism can also be described in terms of two broader components, namely Perfectionist Strivings (which integrates the SOP facet) and Evaluative Concerns (which integrates the SPP facet), SOP and SPP have been considered valid indicators of these two higher-level dimensions (e.g., Bieling et al., 2004; Frost et al., 1993).

The SOP and SPP facets typically embody perfectionism's functional and dysfunctional features, respectively (see, for a review, Stoeber & Otto, 2006). However, ongoing research associates SOP with dysfunctional features, such as anxiety, depression, social media burnout, and difficulties in controlling impulsive behaviors when distressed (Harren et al., 2021; Hewitt & Flett, 1991, 2002; Vois & Damian, 2020). In response to these inconsistent results regarding the adaptive and maladaptive aspects of perfectionism, two models propose combining the two main perfectionism dimensions to provide a more accurate and comprehensive description of perfectionist individuals; first, the Tripartite Model of Perfectionism (Stoeber & Otto, 2006) and then, in response to the limitations of this model, the 2×2 Model of Perfectionism (Gaudreau & Thompson, 2010). The tripartite model considers three types of perfectionism: Healthy Perfectionism (high levels of SOP and low levels of SPP), Unhealthy Perfectionism (high SOP and high SPP), and

Non-Perfectionism (low SOP). According to Stoeber and Otto (2006), Healthy Perfectionists exhibit higher levels of functionality compared to Non-Perfectionists, while Non-Perfectionists, in turn, are more functional than Unhealthy Perfectionists.

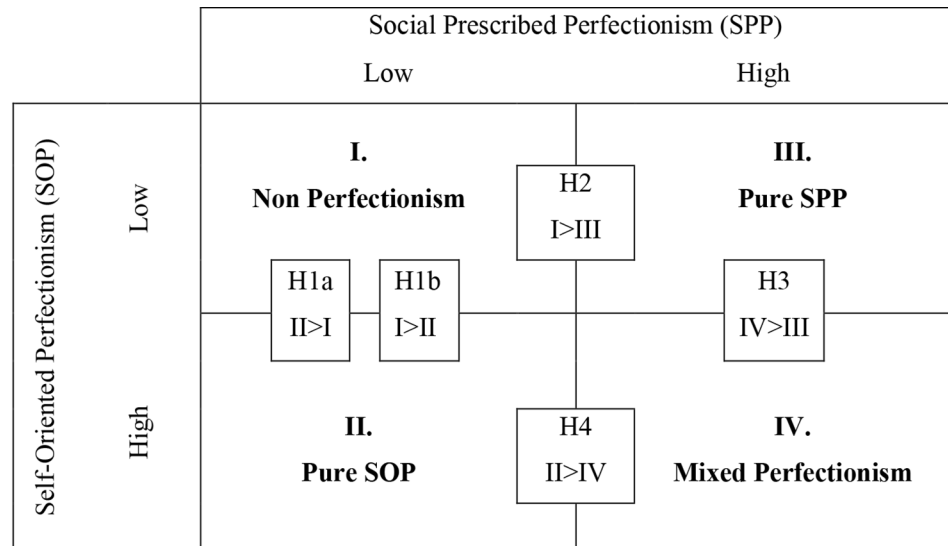
Similar to the Tripartite Model, the 2×2 model of dispositional perfectionism (Gaudreau, 2012; Gaudreau & Thompson, 2010) proposes that the two facets of perfectionism (SOP and SPP) coexist within individuals at different levels, that the within-person combination of these facets varies across individuals and should be taken into account in examining the antecedents, processes, and outcomes of perfectionism. However, Gaudreau and Thompson (2010) argue that the tripartite model labels the perfectionism subtypes as inherently healthy and unhealthy, and this labeling can lead to preconceived expectations that hinder the exploration and theoretical understanding of factors that may either exacerbate or mitigate the vulnerabilities associated with these perfectionism subtypes. On the other hand, according to the same authors, the tripartite model is incomplete since combining the two facets of perfectionism results in four and not three subtypes (Gaudreau & Thompson, 2010).

Based on these considerations, the 2×2 Model of Perfectionism identifies itself as an open-ended theoretical system that encompasses four subtypes of perfectionism: Non-Perfectionism (low levels of SOP and SPP); Pure SOP (high SOP and low SPP); Pure SPP (high SPP and low SOP); and Mixed Perfectionism (high levels of SOP and SPP) (Gaudreau, 2012; Gaudreau & Thompson, 2010). The 2×2 model formulates specific hypotheses regarding how these four perfectionism subtypes manifest distinct effects on psychological outcomes (Gaudreau, 2012). Thus, Pure SOP is expected to be associated both with better (hypothesis 1a) or worse (hypothesis 1b) outcomes than Non-Perfectionism¹. On the other hand, Pure SPP should be related to greater dysfunctionality than Non-Perfectionism (hypothesis 2). Finally, Mixed Perfectionism is expected to be associated with better outcomes than Pure SPP (hypothesis 3) but worse outcomes than Pure SOP (hypothesis 4). Figure 1 illustrates the 2×2 model of perfectionism.

Considering all that we have mentioned so far, using the 2×2 model of perfectionism seems to enable a more accurate description of perfectionist individuals, including their functional and dysfunctional capacities. As a consequence, this model has been used to examine the effect perfectionistic traits may have on various variables related to

¹ Initially, Gaudreau and Thompson (2010) introduced a third alternative hypothesis (hypothesis 1c) suggesting that Pure SOP and Non-Perfectionism would yield similar outcomes. However, Gaudreau (2013) later concluded that non-significant results do not provide sufficient evidence to support an equality hypothesis such as 1c; for that reason, we did not include this hypothesis in the present investigation.

Fig. 1 The 2×2 model of perfectionism: the four perfectionism subtypes and the four functional adjustment hypotheses
 Note. Adapted from “The 2×2 model of perfectionism: Commenting the critical comments and suggestions of Stoerber (2012)” (Gaudreau, 2013, p. 352). > denotes “better adjustment than”



both adaptive and non-adaptive psychological functioning (Gaudreau et al., 2018; Kljajic et al., 2017; Waleriańczyk & Stolarski, 2022). It seems that the most adaptive variables (e.g., cognitive reappraisal and positive affect) are more likely to confirm the four 2×2 model hypotheses, given that hypotheses 1 and 3 are not always validated with maladaptive variables (e.g., expressive suppression or negative affect, Damian et al., 2014; Franche & Gaudreau, 2016; Hill & Davis, 2014). In this context, the present study aims to enhance our understanding of how applicable the 2×2 model is to the wide range of functional and dysfunctional outcomes linked to perfectionistic traits.

Perfectionism and distress

According to Hewitt and Flett (1993), perfectionist subjects are more vulnerable to the onset or maintenance of distress due to their tendency to experience stressful situations (e.g., when they perceive that their performance in a task or objective has failed) as more threatening or aversive to their self-concept compared to non-perfectionists. In turn, the authors affirm that this perception contributes to increasing the negative impact of stressful events, which may lead to distress.

The scientific literature has explored the relationship between the facets of perfectionism and distress. There is agreement on the positive association between SPP and distress (e.g., Castro et al., 2017; Douilliez & Lefèvre, 2011; Dunkley et al., 2003; Flett et al., 2005; Molnar et al., 2020). However, for SOP, studies have been contradictory since some verify positive associations (e.g., Castro et al., 2017; Molnar et al., 2020), while others do not find a reliable association between the constructs (e.g., Douilliez & Lefèvre, 2011; Dunkley et al., 2003).

Regarding the relationship between the 2×2 subtypes of perfectionism and distress, previous studies have demonstrated that Non-Perfectionism (compared with Pure SPP) and Pure SOP (compared with Mixed Perfectionism) present lower levels of distress, confirming hypotheses 2 and 4, respectively (e.g., Crocker et al., 2014; Douilliez & Lefèvre, 2011; Franche & Gaudreau, 2016). However, the empirical status of the other hypotheses is not clear: it is necessary to clarify whether Pure SOP has lower stress levels (hypothesis 1a) or higher stress levels (hypothesis 1b) than Non-Perfectionism and whether Pure SPP is associated with greater distress than Mixed Perfectionism (hypothesis 3).

Perfectionism and cognitive emotion regulation (CER)

According to the authors of the concept of cognitive emotion regulation (CER; Garnefski et al., 2001), this construct includes both maladaptive strategies (i.e., self-blame, blaming others, rumination, and catastrophizing) and adaptive strategies (i.e., acceptance, refocus on planning, positive refocusing, positive reappraisal, and putting into perspective). Cognitive regulation of emotions can be particularly beneficial in psychological intervention since it precedes the behavioral process. As stated by Garnefski et al. (2001), patients perform a more conscious and efficient behavior when taught to plan actions instead of being taught to act immediately.

Adaptive and maladaptive CER strategies have been extensively studied (e.g., Garnefski & Kraaij, 2007; Garnefski et al., 2004), including in relation to perfectionism (Martin & Dahlen, 2005; Rudolph et al., 2007; Zeifman et al., 2019). Regarding maladaptive CER strategies, individuals with self-oriented perfectionism (SOP) or socially

prescribed perfectionism (SPP) traits tend to adopt them. Rudolph et al. (2007) found that SOP is associated with self-blame and that SPP is related to self-blame, rumination, and catastrophizing. Similarly, Castro et al. (2017) claimed that SPP was positively related to all CER maladaptive dimensions while SOP was associated with self-blame and catastrophizing. According to these authors, individuals with high levels of SOP use maladaptive CER strategies when they perceive failure for not meeting the high-performance standards they established. The authors stated that using such strategies determine maladjustment, perceived distress, and negative affect.

Regarding CER adaptive strategies, evidence from scientific literature does not provide too much insight regarding their relationship with the central facets of perfectionism. Concerning Rudolph et al. (2007) verified its association with reduced use of positive reappraisal and putting into perspective strategies. Similarly, Castro et al. (2017) observed that SPP is negatively related to positive reevaluation and planning, positive refocusing, and putting into perspective. However, a recent study (Vois & Damian, 2020) reported the existence of a positive association between SPP and reappraisal, an adaptive CER strategy (Aldao & Nolen-Hoeksema, 2010).

Although three researcher groups (Castro et al., 2017; Macedo et al., 2017; Rudolph et al., 2007) did not find a significant association between SOP and CER adaptive strategies, some studies observed that reevaluation was positively related to SOP (Hill & Davis, 2014; Vois & Damian, 2020). This incongruity can be explained by the fact that SOP trait is not fully functional (Frost et al., 1990; Stoeber & Otto, 2006).

Although empirical results concerning the relationship between each central facet of perfectionism (SOP and SPP) and CER adaptive strategies are not consistent, this might be the consequence of characterizing perfectionist individuals solely based on one facet at a time, disregarding the coexistence of multiple facets within individuals. In our perspective, the 2×2 model of perfectionism (Gaudreau, 2012; Gaudreau & Thompson, 2010), which takes into account the pattern of perfectionism facets in each individual, can offer a more nuanced and comprehensive explanation of the association between perfectionism and CER strategies.

The study of CER strategies with the 2×2 model was only partially accomplished with cognitive reappraisal, an adaptive strategy: in a sample of coaches, Hill and Davis (2014) confirmed hypotheses 1a and 3, demonstrating that Pure SOP (compared with Non-Perfectionism) and Mixed Perfectionism (compared with Pure SPP) expressed higher levels of cognitive reappraisal. This investigation is insufficient to analyze the contribution of perfectionism subtypes to cognitive emotion regulation strategies, given that it only

focused on one adaptive CER strategy and did not assess any maladaptive CER strategy. We want to overcome these limitations by contemplating the adaptive and maladaptive CER strategies proposed by Garnefski et al. (2001) in our study.

Perfectionism and perfectionist cognitions

Perfectionist cognitions have been positively related to distress and both central facets of perfectionism (SOP and SPP; Flett et al., 1998; Hewitt & Flett, 2002). Flett et al. (1998) consider that psychological distress arises when perfectionist individuals become aware of the discrepancies between the unrealistic standards they have established and their actual performance. These authors found a positive correlation between the frequency of perfectionist cognitions and depressive and anxiogenic symptomatology, presumably because individuals with high levels of perfectionist cognitions tend to worry about their inability to achieve perfectionist standards and to anticipate this concern for the future (Flett et al., 1998). Apparently, perfectionists are more prone to experience greater stress levels due to their high standards, and this propensity is maintained when using self-criticism in response to fall short of high standards (Rice et al., 2017).

Despite the evidence regarding the role of perfectionist cognitions in the association between perfectionism traits and negative outcomes, these cognitions have not yet been examined using the 2×2 model of perfectionism.

Aims

This study aims to test the 2×2 model of perfectionism in adults, evaluating the differences predicted by the model between the four perfectionism subtypes in terms of perceived distress and two cognitive indicators (CER strategies and perfectionist cognitions). Considering the 2×2 model's hypotheses (Gaudreau, 2012), we expect the following results: (I) Pure SOP may present both better (hypothesis 1a) or worse (hypothesis 1b) indicators when compared to Non-Perfectionism on levels of perceived distress, adaptive and maladaptive CER strategies, and perfectionist cognitions; (II) Pure SPP will demonstrate higher levels of perceived distress, maladaptive CER strategies, and perfectionist cognitions, but lower levels of adaptive CER strategies, compared with Non-Perfectionism (hypothesis 2) and Mixed Perfectionism (hypothesis 3); finally, (III) Pure SOP, compared with Mixed Perfectionism, will show lower levels on perceived distress, maladaptive CER strategies, and perfectionism cognitions, but greater levels on adaptive CER strategies (hypothesis 4).

Materials and methods

Participants

Two hundred and thirteen adults collaborated in this study. Participants were aged between 18 and 62 years ($M=34.07$, $SD=12.04$), with the majority being female (72.8%) and with Portuguese nationality (93.9%). According to their professional status, participants were employed (70.4%), students (25.4%), or in a situation of unemployment or retirement (4.2%). Participants reported academic qualifications mostly at the high education level (64.8%), but also at secondary (27.7%) and elementary education level (7.6%). Less than 10% of the sample was undergoing psychological/psychiatric treatment during the data collection (8.5%). For further demographics, see Online Resource 1 - Table 1. The inclusion criteria for participating were being aged between 18 and 65 years, as well as being able to understand, read, and write in Portuguese.

The evaluation of the 2×2 model of perfectionism has been carried out through regression analysis, including moderated hierarchical regression (Cohen et al., 2003) or multiple linear regressions when the interactive term was not significant (Gaudreau, 2012). Power analysis through G*Power (version 3.1.9.2) was considered for both analytic approaches. Thus, our sample size ($n=213$) provided sufficient statistical power (80%) to detect a small effect size ($f^2=0.04$, corresponding to $\Delta R^2=0.038$) as significant in moderated hierarchical regressions (one tested predictor - the interaction term - out of three predictors) and to detect small-sized regression coefficients ($f^2=0.04$) for multiple linear regressions (two predictors).

Measures

Perfectionism

The 45-item Multidimensional Perfectionism Scale (HMPS; Hewitt & Flett, 1991; Portuguese version: Soares et al., 2003) comprises three subscales: self-oriented perfectionism (SOP; e.g., "It is very important that I am perfect in everything I attempt"), socially prescribed perfectionism (SPP; e.g., "I feel that people are too demanding of me"), and other-oriented perfectionism. According to this study's objectives, only SOP and SPP subscales were used. Items are scored on a 7-point rating scale (1 = *Completely disagree* to 7 = *Completely agree*). The internal consistency indexes for the SOP (Cronbach's $\alpha=0.88$) and the SPP (Cronbach's $\alpha=0.87$) subscales obtained in this study were acceptable.

Perfectionist cognitions

The 25-item Perfectionist Cognitions Inventory (PCI; Flett et al., 1998; Portuguese version: Carmo et al., 2018) measures the frequency of automatic thoughts associated with perfectionism. Items are rated on a 5-point scale (1 = *Never* to 5 = *Always*). The internal consistency coefficient obtained in this study for this unidimensional scale was excellent (Cronbach's $\alpha=0.95$).

Perceived distress

The Perceived Stress Scale (PSS; Cohen et al., 1983; Portuguese version: Pais Ribeiro & Marques, 2009) assesses the degree to which individuals perceive their daily life situations as unpredictable, uncontrollable, and overwhelmed. This 13-item questionnaire, rated on a 4-point scale (0 = *Never* to 4 = *Often*), presented an excellent reliability level in our study (Cronbach's $\alpha=0.95$).

Cognitive emotion regulation

The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001; Portuguese version: Castro et al., 2013) measures the thought style the individual adopts to regulate emotions during stressful life events. It comprises 36 items rated on a 5-point scale (1 = *Never* to 5 = *Always*) and is organized into eight subscales. Four subscales refer to maladaptive strategies: self-blame (thoughts of blaming yourself; in the original study, Cronbach's $\alpha=0.76$), blaming others (thoughts of blaming others; $\alpha=0.86$), rumination (thinking about the negative event; $\alpha=0.82$), and catastrophizing (thoughts that emphasize the terror of an experience; $\alpha=0.81$). The other four subscales correspond to adaptive strategies: acceptance (thoughts of conformity; $\alpha=0.66$); positive refocusing (thinking about positive experiences; $\alpha=0.83$); positive reevaluation and planning (thinking about positive meanings of the event and the steps to deal with it; $\alpha=0.89$); and putting into perspective (thoughts that minimize the severity of the event; $\alpha=0.78$). The internal consistency of the subscales was also acceptable in the present sample, except for the acceptance subscale (Cronbach's α lower than 0.7).

Procedure

Data collection

The sample was mainly recruited through the snowball sampling technique, with an initial set of participants chosen for convenience using the social network Facebook. Recent data estimates 59.4% as the global social media penetration

rate, being Facebook the most popular social network worldwide (Statistica, 2023). Furthermore, since each Facebook user has a news feed and can integrate several groups simultaneously, even without knowing their users, recruiting participants through this social media platform allows cost-effective data collection from diverse populations (Bhutta, 2012). With this in mind, the study was announced on the Facebook feed of one of the researchers and in three Facebook groups. Users were asked to share the post with other contacts who fit the specifications of the target population.

In the published post, participants were informed that the study focused on emotions and that the questionnaire would take around 15 min to complete. They were also told of the possibility of accessing the investigation's global results and entering a lottery for a €20 voucher in a bookstore. There was a place after the questionnaire to provide the phone number or email address for contact.

The online questionnaire was made available on the Google Forms platform and included a brief introduction statement outlining the study's broad aims, assuring participants' confidentiality, anonymity, and voluntary participation. To avoid careless responses, we ask participants to answer as truthfully as possible and, if they wish, they could withdraw at any time. Following that, an informed consent form was provided to the participants before they filled out the questionnaire.

Data analyses

The results of this cross-sectional study were analyzed with the SPSS, Statistical Package for the Social Sciences for Windows (v.25). To ensure that participants provided no duplicate answers, sociodemographic responses, and contact details were checked and compared. Outliers were assessed with Cook's distance (Cohen et al., 2003).

The procedures for testing the 2×2 model of perfectionism were based on the methodological note of Gaudreau (2012). First, a moderation analysis using hierarchical regression was performed for each psychological outcome considered in the study (dependent variables) (Cohen et al., 2003), using SOP and SPP as predictors. In this analysis, the centered scores of the predictors (i.e., z-scores for SOP and SPP) entered the first block of the hierarchical regression, followed by the inclusion of the interaction term in the second block (i.e., $zSOP \times zSPP$).

If this interaction term does not account significantly for the variance of the dependent variable, a multiple linear regression model (using uncentered SOP and SPP scores as predictors and excluding the interaction term) was tested, as suggested by Gaudreau (2012).

Standardized effect size measures (Cohen's *d*) were roughly estimated using the Gaudreau method: predicted

values (estimated means) of the dependent variables were computed at one standard deviation below and above the mean for SOP and SPP, to estimate the magnitude of the difference between perfectionism subtypes.

Results

Preliminary analyses

SOP and SPP were positive and significantly correlated ($r = .54, p < .001$). Despite this, these two facets of perfectionism showed a different correlation pattern with the other considered variables (Table 1): while both facets correlated positively with perceived stress and maladaptive emotion regulation strategies, correlation with SPP was null or even negative for adaptive emotion regulation strategies. These results suggest the existence of specific effects of each perfectionism dispositional facet on psychological outcomes. However, since the bivariate correlations do not control for the shared variance between perfectionism facets, these results should be interpreted with caution, as Kljajic et al. (2017) recommend.

Main analyses

Moderated hierarchical regression models did not detect any moderation effect as significant for the dependent variables considered (*p*-values for the $zSOP \times zSPP$ interaction term ranged from 0.130 – for the Catastrophizing strategy – to 0.989 – for the Perfectionist Cognitions). On the contrary, regression models including only SOP and SPP as predictors were always significant ($p < .05$). All these models are presented in Table 2 of Online Resource 2. No outliers were found. Predicted values for the four subtypes of perfectionism in all the dependent variables (assessed one standard deviation below and above the mean) are graphically displayed in Fig. 2. Table 3 of Online Resources demonstrates the extent to which the results obtained corroborate the four hypotheses of the 2×2 Model of Perfectionism and the magnitude of the standardized effect (Cohen's *d*) corresponding to the differences between the perfectionism subtypes. The results for each dependent variable are described separately below.

Perceived distress

While the main effect for SPP was positive and significantly associated with perceived distress ($\beta = 0.39, p < .001$), the SOP effect was null ($\beta = 0.02, p = .812$; Fig. 2, panel A). Consequently, Pure SOP and Non-Perfectionism subtypes, as well as Mixed Perfectionism and Pure SPP subtypes,

Table 1 Descriptive statistics and bivariate Pearson correlations (n = 213)

Measure	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. SOP	4.77	0.99											
2. SPP	3.48	0.95	0.54**										
3. Perceived Distress	3.00	0.53	0.23**	0.40**									
4. Perfectionist Cognitions	3.12	0.80	0.67**	0.56**	0.32**								
5. CER: Self-blame	2.68	0.90	0.32**	0.48**	0.38**	0.44**							
6. CER: Blaming Others	2.24	0.84	0.26**	0.33**	0.12	0.43**	0.22**						
7. CER: Rumination	3.46	0.83	0.36**	0.38**	0.44**	0.47**	0.56**	0.36*					
8. CER: Catastrophizing	2.38	0.89	0.43**	0.49**	0.34**	0.54**	0.40**	0.50**	0.48**				
9. CER: Acceptance	3.37	0.70	0.18*	0.22**	0.11	0.34**	0.38**	0.28**	0.48**	0.20*			
10. CER: Positive Refocusing	3.21	0.81	0.15*	0.02	-0.33**	0.26**	-0.12	0.12	-0.04	0.05	0.33**		
11. CER: Positive Reappraisal and Planning	3.82	0.76	0.06	-0.14*	-0.35**	0.14*	-0.08	0.05	0.11	-0.09	0.39**	0.71**	
12. CER: Putting into Perspective	3.59	0.83	0.15*	-0.06	-0.16*	0.33**	0.07	0.23**	0.19**	-0.01	0.45**	0.56**	0.63**

Note. SOP = Self-Oriented Perfectionism; SPP = Socially Prescribed Perfectionism; CER = Cognitive Emotion Regulation; M = Mean; SD = Standard deviation

* $p < .05$

** $p < .01$

presented similar levels of perceived distress (in both cases, the difference between subtypes corresponds to $d=0.03$). Thus, considering these null results, the support or rejection of hypotheses 1 and 3 was inconclusive for this psychological outcome. On the other hand, Pure SPP was associated with higher perceived distress than Non-Perfectionism ($d=0.78$), confirming hypothesis 2, while Pure SOP was associated with lower perceived distress than Mixed Perfectionism ($d=0.78$), confirming hypothesis 4.

Perfectionist cognitions

Both SOP and SPP exerted a positive and significant contribution to the presence of perfectionist cognitions (SOP: $\beta=0.52, p < .001$; SPP: $\beta=0.27, p < .001$; Fig. 2, panel B). The Pure SOP subtype presented more frequent perfectionist cognitions than the Non-Perfectionism subtype ($d=1.05$), supporting hypothesis 1b, and less than Mixed Perfectionism ($d=0.55$), supporting hypothesis 4. Pure SPP subtype was also associated with higher perfectionist cognitions than Non-Perfectionism ($d=0.55$), supporting hypothesis 2, but lower than Mixed Perfectionism ($d=1.05$), not supporting hypothesis 3.

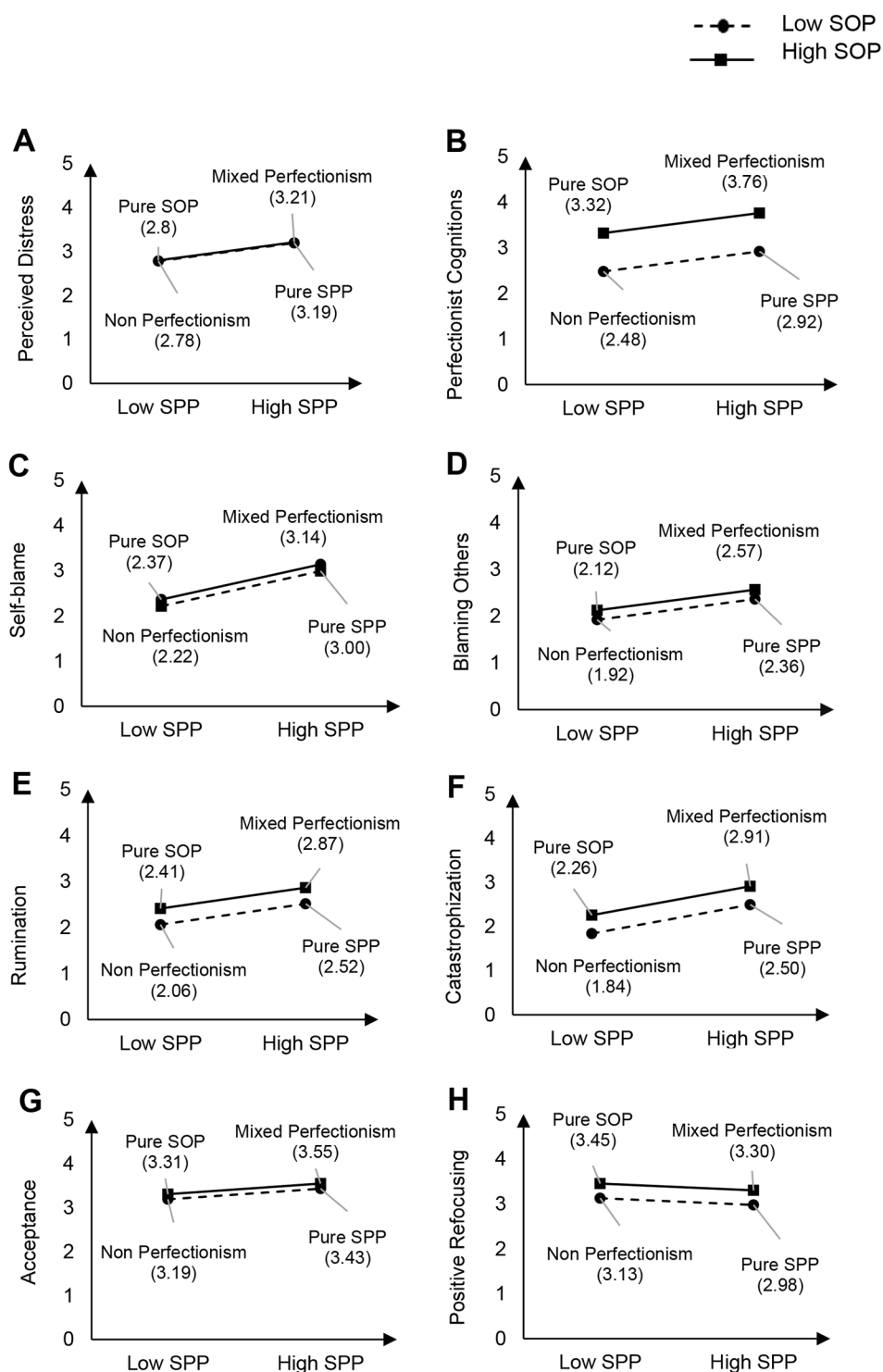
Cognitive emotion regulation strategies

Self-blame SPP had a positive and significant effect on the use of the self-blame strategy ($\beta=0.43, p < .001$), but SOP was not associated with this variable ($\beta=0.08, p = .251$; Fig. 2, panel C). Pure SOP and Non-Perfectionism subtypes presented rather similar levels of self-blame ($d=0.16$), as well as Mixed Perfectionism and Pure SPP ($d=0.16$). Thus, the confirmation or rejection of hypotheses 1 and 3 was not possible. Pure SPP subtype was associated with higher levels of self-blame compared to Non-Perfectionism ($d=0.87$), confirming hypothesis 2, while Pure SOP presented lower self-blame than Mixed Perfectionism ($d=0.87$), supporting hypothesis 4.

Blaming others The main effect of SPP on blaming others was positive and significant ($\beta=0.26, p < .001$), contrary to SOP, which had a positive but negligible effect ($\beta=0.12, p = .118$; Fig. 2, panel D). Pure SOP and Non-Perfectionism showed similar results on blaming others ($d=0.24$), as well as Mixed Perfectionism and Pure SPP ($d=0.24$), making the support of hypotheses 1 and 3 inconclusive. Pure SPP was associated with higher levels of blaming others than Non-Perfectionism ($d=0.53$), supporting hypothesis 2. The Pure SOP subtype showed lower

Fig. 2 Outcomes predicted values for the four subtypes of perfectionism

Note. The vertical axis represents the estimated values of each outcome predicted by the main effects of self-oriented perfectionism (SOP) and socially prescribed perfectionism (SPP). MS Office 365 was used to create these graphs



levels of this strategy compared to Mixed Perfectionism ($d=0.53$), supporting hypothesis 4).

Rumination Both SOP and SPP main effects on rumination were positive and significant (SOP: $\beta=0.21$, $p=.005$;

SPP: $\beta=0.27$, $p<.001$; Fig. 2, panel E). Pure SOP subtype showed higher rumination than Non-Perfectionism ($d=0.42$), supporting hypothesis 1b, but lower than Mixed Perfectionism ($d=0.54$), confirming hypothesis 4. Pure SPP was associated with higher rumination compared with Non-Perfectionism ($d=0.54$), supporting hypothesis 2) but

lower compared to Mixed Perfectionism ($d=0.42$), rejecting hypothesis 3.

Catastrophizing SOP and SPP revealed positive and significant main effects on catastrophizing (SOP: $\beta=0.23$, $p<.001$; SPP: $\beta=0.37$, $p<.001$; Fig. 2, panel F). Pure SOP subtype had higher levels of catastrophizing than Non-Perfectionism ($d=0.47$), supporting hypothesis 1b, and lower than Mixed Perfectionism ($d=0.73$), supporting hypothesis 4. Pure SPP was associated with higher levels of catastrophizing than Non-Perfectionism ($d=0.73$, supporting hypothesis 2), but lower than Mixed Perfectionism ($d=0.47$, not supporting hypothesis 3).

Acceptance SPP showed a positive and significant effect on acceptance ($\beta=0.17$, $p=.032$), but the SOP effect did not reach statistical significance ($\beta=0.08$, $p=.298$; Fig. 2, panel G). Pure SOP subtype had similar levels of acceptance as Non-Perfectionism ($d=0.17$), not clarifying hypothesis 1. Pure SOP also showed somehow lower levels than Mixed Perfectionism ($d=0.34$), apparently rejecting hypothesis 4, since acceptance can be considered an adjusted emotion control strategy. Pure SPP acceptance levels were similar to Mixed Perfectionism ($d=0.17$), not clarifying hypothesis 3, and somehow higher than Non-Perfectionism ($d=0.34$), apparently not supporting hypothesis 2.

Positive refocusing While the effect of SOP on positive refocusing was positive ($\beta=0.20$, $p=.014$), SPP has a nonsignificant negative effect ($\beta=-0.09$, $p=.294$; Fig. 2, panel H). Thus, Pure SOP showed higher levels of positive refocusing than Non-Perfectionism ($d=0.40$), confirming hypothesis 1a, but levels were somehow similar to Mixed Perfectionism, not providing evidence for hypothesis 4 ($d=0.19$). Pure SPP demonstrated results on positive refocusing similar to Non-Perfectionism, not supporting hypothesis 2 ($d=0.19$), but lower levels than Mixed Perfectionism, confirming hypothesis 3 ($d=0.40$).

Positive reappraisal and planning SOP had a positive and significant main effect on positive reappraisal and planning ($\beta=0.19$, $p=.016$), while the SPP main effect was negative and significant ($\beta=-0.25$, $p=.005$; Fig. 2, panel I). Pure SOP subtype revealed higher levels of positive reappraisal and planning compared to Non-Perfectionism ($d=0.39$), supporting hypothesis 1a, and compared to Mixed Perfectionism ($d=0.49$), supporting hypothesis 4. Pure SPP subtype was associated with lower positive reappraisal and

planning compared to Non-Perfectionism ($d=0.49$), supporting hypothesis 2), and also lower than Mixed Perfectionism ($d=0.39$), supporting hypothesis 3.

Putting into perspective The SOP main effect on putting into perspective was positive and significant ($\beta=0.26$, $p<.001$), while the SPP effect was negative ($\beta=-0.20$, $p=.012$; Fig. 2, panel J). Thus, Pure SOP subtype adopted more frequently the putting into perspective strategy in comparison with Non-Perfectionism ($d=0.53$), supporting hypothesis 1a, and in comparison with Mixed Perfectionism ($d=0.41$), supporting hypothesis 4. Pure SPP showed lower levels of this strategy compared with both the Non-Perfectionism subtype ($d=0.41$), and the Mixed Perfectionism subtype ($d=0.53$), supporting both hypotheses 2 and 3.

Discussion

The main goal of this study was to test the 2×2 model of perfectionism (Gaudreau & Thompson, 2010) in an unselected sample of adults, assessing whether the differences between the four subtypes of perfectionism with respect to perceived life distress and two cognitive indicators (CER strategies and perfectionist cognitions) are supportive of the hypotheses preconized by this 2×2 model. To our knowledge, this investigation is the first to focus on testing the 2×2 model with regard to perfectionist cognitions and maladaptive CER strategies, two areas considered relevant to understanding how perfectionism impacts psychological functioning.

Considering the hypotheses of the 2×2 model of perfectionism and the literature review, we were expecting to find that Pure SOP subtype presented better (hypothesis 1a) or worse (hypothesis 1b) indicators when compared to the Non-Perfectionism subtype on levels of perceived distress, adaptive and maladaptive CER strategies, and perfectionist cognitions. On the other hand, Pure SPP subtype would be associated with higher levels of perceived distress, maladaptive CER strategies, and perfectionist cognitions but lower levels of adaptive CER strategies, when compared both with Non-Perfectionism (hypothesis 2) and Mixed Perfectionism (hypothesis 3) subtypes. Similarly, Mixed Perfectionism would demonstrate greater dysfunctionality than Pure SOP (hypothesis 4).

Overall, most results revealed partial support for the 2×2 model of perfectionism, although we found full support for two adaptive CER strategies (Positive Reappraisal and Planning, and Putting in Perspective).

In the context of negative indicators (perceived distress, maladaptive CER strategies, and perfectionist cognitions),

hypothesis 1b received clearer support (CER strategies of rumination and catastrophizing, and perfectionist cognitions) than hypothesis 1a, which was never confirmed. These results somehow suggest a potential contribution of the SOP facet to negative outcomes. However, in three out of six negative indicators, we observed proximity between the Pure SOP and the Non-Perfectionism subtypes, a result that does not clarify the debate about the healthy or unhealthy nature of the SOP facet (Gaudreau & Thompson, 2010). Empirical evidence with negative valence variables (Damian et al., 2014; Douilliez & Lefèvre, 2011; Franche et al., 2012; Hill & Davis, 2014) tends to verify similar equivocal results between Pure SOP and Non-Perfectionism subtypes. Curran and Hill's (2017) longitudinal study reported a propensity to perfectionism increase in the general population, so it may be plausible to verify high levels of perceived distress and maladaptive CER strategies in the non-perfectionist population.

As expected, hypothesis 2, as well as hypothesis 4, were consistently confirmed on all negative indicators in the study, demonstrating that the perfectionist subtypes with high levels of SPP (Pure SPP and Mixed Perfectionism), in comparison with the Non-Perfectionism and Pure SOP, respectively, showed greater levels of perceived distress, maladaptive CER strategies, and perfectionist cognitions. This finding highlights the contribution of the SPP facet to maladaptive outcomes (Stoeber & Otto, 2006; Vois & Damian, 2020). Still, supporting that Pure SPP is more dysfunctional than Non-Perfectionism (hypothesis 2) reinforces the use of the 2×2 model of perfectionism (Gaudreau & Thompson, 2010) as opposed to the tripartite model (Stoeber & Otto, 2006), which grouped these two subtypes into a single subtype (i.e., "Non-Perfectionism").

In the case of hypothesis 3, which compares the two subtypes with high SPP levels (Pure SPP versus Mixed Perfectionism), it was never supported with negative indicators, either because the Pure SPP subtype proved to be more adaptive than the Mixed Perfectionism subtype (rumination and catastrophizing strategies, and perfectionist cognitions) or because there were no significant differences between the Mixed Perfectionism and Pure SPP subtypes (self-blame and blaming others strategies). These results suggest that concerning negative outcomes, sometimes the presence of SOP might exacerbate the SPP's dysfunctionality, rather than mitigate it, while other times its presence might neither mitigate nor exacerbate SPP effects. Several previous studies concluded the null support of hypothesis 3 in negative valence variables (Damian et al., 2014; Franche & Gaudreau, 2016; Hill & Davis, 2014), but this question needs further empirical investigation.

Now considering the positive indicators of this study (adaptive CER strategies), the 2×2 model was fully

confirmed on the Positive reevaluation and planning and the Putting into perspective strategies. These results confirm the adequacy of the 2×2 model with the positive valence outcomes (Damian et al., 2014; Franche & Gaudreau, 2016; Hill & Davis, 2014) and denote that the two strategies mentioned are closer to the perfectionist mindset hypothesized by Gaudreau and Thompson (2010).

Both with Positive reevaluation and planning and Putting into perspective strategies, as well as Positive refocusing, support was found in hypothesis 1a instead of hypothesis 1b, indicating that establishing high-performance standards for intrinsic reasons is especially relevant to adopting adaptive CER strategies. In other words, our results demonstrated that people with Pure SOP tend better to regulate their emotions in the face of stressful situations, given that they consider that these stressful events are an opportunity for personal growth, plan steps to better deal with them, relativize them when comparing with other events, and think of pleasant and pleasurable matters to forget them.

Positive refocusing strategy, however, only partially supported the 2×2 model. Indeed, positive refocusing seems to be adopted with similar intensity by the Pure SPP and the Non-Perfectionism subtypes (not confirming hypothesis 2) and by the Pure SOP and Mixed Perfectionism (not confirming hypothesis 4). Only hypothesis 3 was validated since Pure SPP subtype appeared as less functional than Mixed Perfectionism. Again, this result reinforces the relevance of the 2×2 model of perfectionism (Gaudreau & Thompson, 2010) in relation to the tripartite model (Stoeber & Otto, 2006), which classified Mixed Perfectionism (named "Unhealthy Perfectionism") as the least healthy subtype.

The results related to the CER acceptance strategy need a separate interpretation. None of the 2×2 model hypotheses was supported with this measure. Surprisingly, we found significantly higher acceptance levels in the least functional perfectionism subtypes (Pure SPP and Mixed Perfectionism), which could denote the possible adaptive capacities of SPP (Vois & Damian, 2020). However, two results recommend cautious interpretations: a positive correlation exists between acceptance and rumination ($r = .48, p < .01$), showing that acceptance may not be a clearly adaptive CER strategy; furthermore, the low internal consistency of this subscale ($\alpha = 0.66$) may also suggest that participants could not have answered consistently to its items, perhaps because they might have not fully understood their meaning. Martin and Dahlen (2005) also verified a low internal consistency for the Acceptance strategy subscale, as well as a positive association with depression, stress, and unhealthy anger suppression. According to these investigators, exploring the effects of perfectionism in acceptance regulation strategy should require an alternative measure with more robust psychometric qualities.

Overall, our findings related to positive outcomes suggest that the SOP facet has a positive influence on psychological functioning, contributing to the adoption of adaptive CER strategies and mitigating the detrimental effects of the SPP facet. However, when the individual adopts maladaptive strategies, SOP may increase the negative effects of the SPP facet.

The contribution of the SOP by SPP interaction was consistently non-significant across the analyzed outcomes. The absence of interactive effects between perfectionism facets has been reported in the literature (e.g., Douilliez & Lefèvre, 2011; Gaudreau, 2012). In the present study, this result suggests that the effects of SOP and SPP are mainly additive concerning negative outcomes, making sometimes the Mixed Perfectionism subtype less adapted than the Pure SPP. However, recent work in personality traits suggests that replicable interaction effects are indeed very small (median $r = .022$; Vize et al., 2022), so a larger sample would be required to assess the presence and consequences of interactive effects on the 2×2 model.

We would like to draw attention to the relationships between Non-Perfectionism and Mixed Perfectionism, as well as between Pure SOP and Pure SPP, which are not explicitly stated in the 2×2 model. Testing the 2×2 model's hypotheses does not allow us to formally distinguish Non-Perfectionism from Mixed Perfectionism, nor Pure SOP from Pure SPP (the difference between these subtypes is only inferred through transitive comparisons). Although the 2×2 model of perfectionism has been fully supported in terms of positive reappraisal and planning, and putting it into perspective CER strategies, the comparison of the predicted values among each subtype reveals that Non-Perfectionism was less adaptive than Mixed Perfectionism in relation to the Putting into perspective strategy (Fig. 2, panel J). Similarly, Pure SPP was more adaptive than Pure SOP in perfectionist cognitions (Fig. 2, panel B). These unexpected findings, along with the fact that Pure SOP was the subtype that reported the most adaptive CER strategies and being perfectionist cognitions positively related to all CER strategies, may shed light on the possibility that using perfectionist cognitions can contribute to improving the adoption of adaptive CER strategies by Pure SOP, which turns out to be an asset for this group of individuals.

We believe that it is crucial to emphasize that validating the 2×2 model of perfectionism through the exclusive test of its explicitly stated hypotheses does not enable us to distinguish the functionality and dysfunctionality of all the subtypes, leaving some divergent aspects of the model to explore. Based on our results, we recommend that future studies do not focus exclusively on the confirmation of the four (five) hypotheses of the model but also include the comparison of the predicted values across each subtype of

perfectionism, to fully benefit from the potentialities of the 2×2 model.

In addition to the abovementioned theoretical implications, the current study also provided several contributions at the clinical intervention level. We highlight the importance of designing prevention programs focused on perceived distress and blame for the general population. This initiative simplifies the process of attaining not only perfectionist subjects but also non-perfectionist individuals, who are prone to increasing levels of perfectionism (Curran & Hill, 2017).

Specifically regarding clinical implications for perfectionist individuals, intervention in rumination and catastrophizing seems important in mitigating psychological maladjustment in Pure SOP and Mixed Perfectionism subtypes. Although Pure SOP (compared to Non-Perfectionism) and Mixed Perfectionism (compared to Pure SPP) used more adaptive CER strategies, which help to cope with stressful situations (Garnefski et al., 2001), these strategies may be being used more casually when adopting maladaptive CER strategies (Aldao & Nolen-Hoeksema, 2010). In this sense, and considering that the presence of SOP does not apparently mitigate the negative effects of SPP, assisting in reducing maladaptive strategies by the Pure SOP and Mixed Perfectionism subjects might enhance the functional capacities of these subtypes. In the case of Pure SOP, the results regarding perfectionist cognitions lead us to consider the hypothesis that, in these individuals, such cognitions may, to some extent, help to increase the adaptive thoughts used by Pure SOP in emotion regulation. On the other hand, since the Pure PSP is the subtype with fewer protector factors (adaptive CER strategies), this subtype may be the one that most needs clinical intervention, both focused on diminishing the negative outcomes and increasing the positive outcomes.

Despite its positive contributions, our study presents several limitations. First, following a cross-sectional design, it was not possible to assess causal effects between perfectionism subtypes and outcomes; a longitudinal design might be preferable in future investigations. Second, although a diverse sample enables data generalization (Hill & Davis, 2014), the dominant majority of female participants in our sample prevented data analysis by gender, which would have been crucial to investigate given that men and women regulate emotions differently (Garnefski et al., 2004). Along the same line, the fact that most of the participants were employed and from higher education may limit our conclusions, given that work and academic studies have a known prominent influence on perfectionism (Stoeber & Stoeber, 2009). Future research may face this constraint by controlling, during sample recruitment, the proportions of the relevant sociodemographic groups (e.g., gender, age, scholarly

level, professional situation) required to study the invariance of the 2×2 model. Third, while our snowball recruitment strategy through Facebook enabled us to reach a more diversified and profitable sample (Bhutta, 2012), results may have been biased given that both perfectionist facets (SPP and SOP) have been associated with problematic Facebook use (Harren et al., 2021). We consider that it would be preferable for future studies to apply the evaluation measures in a mixed way (both online and in person), as well as to activate the “limit to one answer” function of Google Forms to avoid multiple responses from the same participant. Fourth, the generalizability of the results may also be improved by employing informant report measures (Flett et al., 2005) and a scale that assessed adaptive and maladaptive perceptions of stress (Crocker et al., 2014). Given that psychological distress can be studied using instruments that evaluate psychopathological constructs such as depression and anxiety (Macedo et al., 2017), including these measures in future investigations would be beneficial to external validity.

Conclusion

The results of the present study allowed theoretical and practical conclusions. We found that perfectionism subtypes defined by the 2×2 model do not have the same contribution to perceived distress and cognitive indicators, neither to positive versus negative psychological outcomes. Furthermore, when exploring the effects of perfectionism using the 2×2 model, it is relevant to focus not only on the validation of its explicit hypotheses but also on the comparisons between each perfectionism subtype. We conclude that it is essential to continue to value the specific characteristics of the four subtypes of perfectionism during perfectionism theoretical investigation and the development of cognitive intervention programs.

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Author contribution Mariana Guerreiro: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Writing – original draft, Project administration. Luís Faisca: Formal analysis, Writing – Review & Editing. Marta Brás: Visualization, Writing – Review & Editing. Cláudia Carmo: Conceptualization, Funding acquisition, Resources, Supervision, Writing – Review & Editing.

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Data Availability The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

Research involving human participants and/or animals Before participating in the current investigation, the individuals gave their written informed consent. It was explicitly stated that the participation in the survey was entirely voluntary and that participants had the right to discontinue participation at any time or choose not to answer any of the questions. The questionnaire also included the contact details of the researchers and a statement that said if a subject withdrew, no data would be utilized for the analysis.

Informed consent Informed consent was obtained from all individual participants included in the study.

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