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Are Perfectionism Dimensions Risk Factors for Anxiety Symptoms?

A Meta-Analysis of 11 Longitudinal Studies

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Abstract

Background: Over 50 years of theory and research implicates perfectionism in anxiety. However, it is unclear which (if any) perfectionism dimensions are risk factors for anxiety. **Objective:** To address this, we conducted a meta-analysis testing whether socially prescribed perfectionism, concern over mistakes, doubts about actions, self-oriented perfectionism, and personal standards predict increases in anxiety. **Method:** Our literature search yielded 11 relevant studies for inclusion, composed of children, adolescents, undergraduates, community adults, and psychiatric patients. **Results:** Meta-analysis using random-effects models revealed concern over mistakes ($r^+ = .11$), doubts about actions ($r^+ = .13$), and personal standards ($r^+ = .08$), but not socially prescribed perfectionism or self-oriented perfectionism, displayed significant small positive relationships with follow-up anxiety, after controlling for baseline anxiety. **Conclusion:** Research is needed to understand the conditions under which the connection between perfectionism and anxiety becomes stronger (e.g., stress).

Keywords: perfectionism; anxiety; longitudinal; meta-analysis

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Everyone is anxious sometimes (Salunke, 2013), but pathological anxiety is characterized by persistent and excessive fear, worry, physical arousal, and avoidance (Benson-Martin, Stein, & Hollander, 2009). These anxiety symptoms cause profound distress for affected individuals and negatively impact their social relationships, occupational function, and family dynamics (Benson-Martin et al., 2009). Unfortunately, anxiety is one of the most common mental health problems (Lépine, 2002; Spinhoven et al., 2016), and co-occurs with many other undesirable experiences and outcomes, including depressive symptoms, substance abuse, and eating disorders (Benson-Martin et al., 2009; Swinbourne & Touyz, 2007). Hence, given the personal disability and the economic burden associated with anxiety (e.g., Lépine, 2002), there is clearly merit in advancing our understanding of anxiety's etiology.

To this end, there is increased interest in advancing our understanding of the pre-morbid personality of anxious individuals (e.g., Calkins et al., 2009; Weinstock & Whisman, 2006). One personality trait linked to anxiety is perfectionism, with Moser et al. (2012) proposing the association between anxiety and perfectionism is partially due to genetic factors. Another theory (e.g., Dunkley et al., 2003) states the relation between perfectionism and anxiety is primarily attributable to unhealthy coping strategies, such as escape-avoidance (Gnilka, Ashby, & Noble, 2012). Finally, a third theory rests on cognitive explanations (Klibert et al., 2015). As proposed by Ellis (2002), perfectionists are vulnerable to experiences of anxiety because of maladaptive approaches to happiness and survival (e.g., they vigorously pursue accomplishment and approval, while negatively appraising failures and set-backs; Klibert et al., 2015).

Despite these theories, there is a paucity of research directly examining relations between

perfectionism and longitudinal changes in anxiety symptoms, while controlling for baseline anxiety. In fact, most investigators use cross-sectional designs which, unlike longitudinal designs, cannot address temporal precedence. Accordingly, whether perfectionism leads to increases in anxiety is unclear, and clinicians can only speculate as to whether reducing perfectionism reduces anxiety symptoms. Moreover, given evidence that correlations do not stabilize until $N > 250$ (Schönbrodt & Perugini, 2013), several studies on perfectionism and anxiety are underpowered and limited in their ability to draw firm conclusions (e.g., Joiner & Schmidt, 1995). As such, the field would benefit from a single analysis that coherently organizes extant findings and addresses limitations associated with small samples. Accordingly, we conducted a rigorous meta-analytic review testing the extent to which different perfectionism dimensions predict longitudinal increases in anxiety symptoms over time.

Perfectionism Dimensions and Anxiety Symptoms

The majority of common variance among several core perfectionism dimensions is accounted for by two higher-order factors: *perfectionistic concerns* and *perfectionistic strivings* (Stoeber & Otto, 2006). Traits comprising perfectionistic concerns include *socially prescribed perfectionism* (perceiving that others demand perfection; Hewitt & Flett, 1991), *concern over mistakes* (highly negative reactions to perceived failures; Frost, Marten, Lahart, & Rosenblate, 1990), and *doubts about actions* (uncertainty regarding performance abilities; Frost et al., 1990). Similarly, perfectionistic strivings consist of a family of traits, including *self-oriented perfectionism* (demanding perfection of oneself; Hewitt & Flett, 1991) and *personal standards* (holding unreasonably high standards; Frost et al., 1990).

Facets of perfectionistic concerns, such as concern over mistakes and doubts about actions (Minarik & Ahrens, 1996), as well as socially prescribed perfectionism (Antony, Purdon,

Huta, & Swinson, 1998; Hewitt & Flett, 1991), are linked to increases in anxiety. In contrast, the

literature on perfectionistic strivings and anxiety reports less consistent findings, with some

studies suggesting perfectionistic strivings are beneficial and others warning that they confer

vulnerability for anxiety. For instance, Joiner and Schmidt (1995) found that, although socially

prescribed perfectionism predicted both depression and anxiety, self-oriented perfectionism

predicted only depression (and not anxiety). Similarly, Antony and colleagues (1998) observed

that anxious and non-anxious groups in their study did not differ on ratings of self-oriented

perfectionism, and Klibert et al. (2015) failed to find an association between self-oriented

perfectionism and generalized anxiety symptoms. This lack of association is inconsistent with

Hewitt and Flett's (2002) contention that individuals with high self-oriented perfectionism are

vulnerable to psychopathology, including generalized anxiety (Klibert et al., 2015). The absence

of significant correlations between perfectionistic strivings and anxiety is also at odds with

recent research providing evidence of both perfectionistic concerns and perfectionistic strivings

being transdiagnostic factors, given their association with various forms of psychopathology

(Limburg et al., 2016; Egan, Wade, & Shafran, 2011). Accordingly, the relationship between

perfectionistic strivings and anxiety remains unclear and contentiously debated.

Advancing Research on Perfectionism and Anxiety Symptoms Using Meta-Analysis

A meta-analysis could elucidate between-study inconsistencies and address questions of

which specific dimensions of perfectionism confer risk for anxiety by providing a quantitative

synthesis of extant literature and allowing for an overall conclusion to be reached (Smith et al.,

2016). Advantages of a meta-analysis will help overcome limitations associated with small

sample sizes (Card, 2012), facilitating understanding of the longitudinal effects of perfectionism

dimensions on anxiety. This approach will be particularly useful in clarifying inconsistencies in

longitudinal research concerning perfectionistic strivings and anxiety. Meta-analysis will also provide a more inclusive and generalizable conclusion regarding the effects of perfectionism dimensions on anxiety symptoms, which is hard to establish through a single longitudinal study.

Objectives and Hypotheses

Are certain perfectionistic traits part of a premorbid personality structure that confers risk for anxiety symptoms? We answered this question by comprehensively meta-analyzing longitudinal research on this important topic. Informed by theoretical accounts (e.g., Ellis, 2002) and by empirical evidence (e.g., Flaxman et al., 2012), we hypothesized baseline perfectionistic concerns (socially prescribed perfectionism, concern over mistakes, doubts about actions) would predict increased anxiety symptoms at follow-up, after controlling for baseline anxiety. We also tested if perfectionistic strivings (self-oriented perfectionism, personal standards) predicts longitudinal increases in anxiety symptoms. However, given inconsistencies in findings, we considered our investigation into the perfectionistic strivings-anxiety link to be exploratory.

Method

Selection of Studies

A literature search using PsycINFO, PubMed, Cochrane, Cinahl, Educational Resource Information Center (ERIC), Embase, ProQuest Dissertations and Theses, Scopus, SPORTDiscus, and Web of Science was conducted to locate longitudinal studies of perfectionism and anxiety. Each search used the keywords and Boolean search terms (perfection*) AND (anxiety OR anxious OR nervous OR avoid* OR selective mutism OR phobia OR fear OR agoraphobia OR intolerance of uncertainty OR obsession OR excessive concern) AND (Longitudinal OR repeated measure OR serial measure OR prospective OR multi-wave OR (over time)). This search yielded 511 studies. After removing duplicates, 316 studies remained. A backward citation search was

then conducted and resulted in the addition of one journal article: Einstein, Lovibond, and Gaston (2000). Next, the first and the second authors reviewed the abstract and method of each article identified and determined inclusion based on the following pre-determined criteria. A study was included if (a) it had a longitudinal design, (b) anxiety symptoms were assessed on more than one occasion, and (c) perfectionism was assessed concurrently with symptoms of anxiety on at least one occasion that preceded the ultimate measure of anxiety. Our literature search and numbers associated with each stage appear in Figure 1. Daily diary studies were excluded, as daily diary studies assess daily processes and do not satisfy the conventional definition of a longitudinal design. Likewise, perfectionism measures used in two or less studies were excluded. No restrictions were placed on study characteristics regarding age, gender, or ethnicity. Studies from any nation and any time period were considered relevant.

Our search yielded 24 studies for inclusion. Interrater agreement on inclusion or exclusion of studies in the meta-analysis was 100%. For any studies where the reported information was insufficient for computing effect sizes, the primary author was contacted ($N =$ 5). All contacted authors provided us with the needed information. On January 11, 2017, all search strategies were terminated and we instigated data reduction and analysis. In total, 13 studies were excluded (see Supplemental Material A for justification). The final sample of included studies was comprised of 11 studies (see Table 1).

Coding of Studies

The first and second author coded each study based on the following 10 characteristics: sample size at baseline, sample type, mean age of participants at baseline, percent female participants at baseline, percent ethnic minority (i.e., non-Caucasian) at baseline, time lag between assessments, percent attrition, publication status, measures used to assess perfectionism,

and measures used to assess anxiety.

Meta-Analytic Procedure

Random-effects analyses were performed using Comprehensive Meta-Analysis software (Version 3.3; Borenstein, Hedges, Higgins, & Rothstein, 2005). We used random-effects models, over fixed-effects models, as the selected studies varied widely in design (see Table 1). Weighted mean effect sizes were computed following Hunter and Schmidt's recommendations (1990). This allowed for estimation of mean effect sizes and variance in observed scores after considering sampling error (Card, 2012). Effect size estimates were weighted by sample size and aggregated. We chose to weigh effects by sample size because studies with larger sample sizes have greater precision than studies with smaller sample sizes (Borenstein, Hedges, Higgins, & Rothstein, 2009). To test the extent to which perfectionism dimensions predict follow-up anxiety, after controlling for baseline anxiety, we computed semi-partial correlations using Mplus 6 (Muthén & Muthén, 1998-2010) with maximum likelihood estimation. Specifically, for each study, we calculated semi-partial correlations by imputing bivariate correlation matrices into Mplus and using path analysis with follow-up anxiety regressed on the perfectionism dimensions of interest and baseline anxiety.

When more than one measure was used to assess anxiety, effects were averaged such that only one effect was included in the analysis (Card, 2012). This strategy is utilized in meta-analyses to guard against overrepresentation of studies that include multiple effects (Borenstein et al., 2009). Likewise, in an effort to minimize heterogeneity, when studies included the variables of interest across three or more waves of data collection, we averaged across effect sizes for all time lags. Before averaging, correlations were transformed into Fisher's Z (Card, 2012). Correlations for each individual study are in Table 2. Overall weighted mean effect sizes

between baseline perfectionism dimensions and follow-up anxiety symptoms, controlling for baseline anxiety symptoms, are in Table 3.

The total heterogeneity of weighted mean effect sizes (Q_T) was assessed for each analysis (see Table 3). A significant Q_T indicates the variance evident in the weighted mean effect sizes is greater than would be expected by sampling error; a non-significant Q_T suggests a weak basis for moderation (Card, 2012). The inconsistency in observed relationships across studies (I^2) was also computed for each analysis. I^2 indicates the total variation across studies due to heterogeneity, and values of 25%, 50%, and 75% correspond to low, medium, and high heterogeneity, respectively (Higgins & Thompson, 2002).

To assess publication bias, we examined funnel plots with observed and imputed studies (see Supplemental Material B). Funnel plots allow for a visual inspection of publication bias. In the absence of publication bias, studies are distributed symmetrically about the mean (Borenstein et al., 2009). In the presence of publication bias, there is expected to be symmetry at the top of the plot and asymmetry near to bottom of the plot (Borenstein et al., 2009). Funnel plots with observed and imputed studies also allow for inspection of how effect sizes shift when missing studies are included. Additionally, we calculated Egger's test of regression to the intercept (Egger, Smith, Schneider, & Minder, 1997; see Table 3). In the absence of publication bias, Egger's regression intercept does not differ significantly from zero (Egger et al., 1997).

Description of Studies

Our literature search identified 11 studies containing relevant effect size data (Table 1). These 11 studies varied in size between 40 and 515, with an average sample size of 285.8 (*SD* = 197.8). The total number of participants pooled across studies was 3,144. Samples were available between 1995 and 2017, with a median year of 2013. There was one sample of youth, three

samples of adolescents, two samples of undergraduates, four samples of community adults, and

one sample of psychiatric patients. The mean age of participants was 24.0 years (SD = 12.4; age

range = 6.2-46.1 years). The average percentage of female participants was 67.6%; the average

percentage of ethnic minority participants was 30.5%.

Measures

   Perfectionism. Trait perfectionism was assessed using seven measures (see Table 1).

Concern over mistakes, doubts about actions, and personal standards were assessed with Frost et

al.'s (1990) Multidimensional Perfectionism Scale (MPS). Oddo-Sommerfeld et al. (2016) used

Altstötter-Gleichand and Bergemann's (2006) German version of the MPS. Self-oriented

perfectionism and socially prescribed perfectionism were assessed with Hewitt and Flett's (1991)

Multidimensional Perfectionism Scale (HMPS). Self-oriented and socially prescribed

perfectionism were also assessed with Flett et al.'s (2000) Child and Adolescent Perfectionism

Scale (CAPS), O'Connor, Dixon, and Rasmussen's (2009) 14-item version of the CAPS (CAPS-

14) and the modified self-oriented and socially prescribed perfectionism subscales of Garner et

al.'s (1983) Eating Disorder Inventory (EDI; see Joiner & Schmidt, 1995). Additionally, one

study used the 5-item short form of the MPS concern over mistakes subscale and the 5-item short

form of the HMPS socially prescribed perfectionism subscale: Sherry et al. (2014). Evidence

suggests these subscales assess stable traits. Rice and Dellwo (2001) administered the MPS twice

over a 10-week period in a sample of undergraduates and reported test-retest coefficients across

subscales ranging from .62 to .88. Similarly, Hewitt and Flett (1991) administered the HMPS

twice over a three-month interval in a sample of outpatients and reported test-retest correlations

across subscales ranging from .60 to .69.

Anxiety. Anxiety was assessed using nine measures (see Table 1): the anxiety subscale of

Zigmond and Snaith's (1983) Anxiety and Depression Scale (HADS-Anx); the self-report

version of Birmaher et al.'s (1999) Screen for Child Anxiety Related Emotional Disorders

(SCARED); the anxiety subscale of Lovibond and Lovibond's (1995) Depression Anxiety and

Stress Scale (DASS-Anx); the anxiety subscale of Warr's (1990) Affective Well-Being Scale

(AWBS-Anx); the anxiety subscale of Ialongo, Kellam, and Poduska's (1999) Baltimore How I

Feel-Young Child Version Child Report (BHIF-YC-C-Anx); Beck et al.'s (1988) Beck Anxiety

Inventory (BAI); the general distress anxious symptoms scale of Watson and Clark's (1991)

Mood and Anxiety Symptom Questionnaire Short Form (MASQ-GDA); the anxious arousal

scale of Watson and Clark's (1991) Mood and Anxiety Symptom Questionnaire Short Form

(MASQ-AA); and the State Anxiety subscale of Laux et al.'s (2013) State-Trait Anxiety

Depression Inventory (STADI-Anx).

Results

Overall Effect Sizes

The weighted mean effect sizes between perfectionism at baseline and anxiety symptoms

at follow-up, while controlling for baseline levels of anxiety, are in Table 2. To facilitate

interpretation of effect sizes, we followed Gignac and Szodorai's (2016) guidelines for small,

medium, and large effect sizes (r = .10, .30, .50, respectively). In addition, we considered effect

sizes below .10 to be marginal in size and non-substantive. All longitudinal perfectionism-

anxiety effects were marginal-to-small in magnitude. For facets of perfectionistic concerns, small

positive significant effects were found between concern over mistakes, and doubts about actions

predicting follow-up up anxiety, while controlling for baseline anxiety. Likewise, for facets of

perfectionistic strivings, a marginal positive, significant effect was observed between baseline

personal standards and follow up anxiety, controlling for baseline anxiety. Conversely, socially

prescribed perfectionism's and self-oriented perfectionism's relationships with follow-up anxiety, controlling for baseline anxiety, were non-significant.

The test of the total heterogeneity of weighted mean effect sizes corresponding to perfectionism dimensions' effects on follow-up anxiety were non-significant. For facets of perfectionistic concerns, I^2 estimates were 0.0% for concern over mistakes, 32.6% for socially prescribed perfectionism, and 19.2% for doubts about actions (see Table 3). I^2 estimates for both facets of perfectionistic strivings were 0.0% (see Table 3). This suggests the assumption of homogeneity should be retained and indicates common study effects (Card, 2012). Results also indicate differences in relevant effect sizes were not greater than would be expected based on sample variation alone.

Publication Bias

Egger's test of regression to the intercept (see Table 3) was not significant for any of the relationships between perfectionism dimensions and follow-up anxiety symptoms, controlling for baseline anxiety. Likewise, funnel plots (see Supplemental Material B) revealed that after imputing missing studies using "Trim and Fill" (see Table 3), adjusted point estimates provided the same substantive implications as observed point estimates. As such, we found limited evidence of publication bias.

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Discussion

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Case histories, theoretical accounts, and empirical studies suggest an important relationship between perfectionism and anxiety (e.g., Antony et al., 1998; Kawamura, Hunt, Frost, & DiBartolo, 2001; Minarik & Ahrens, 1996; O'Connor, Rasmussen, & Hawton, 2010). However, it is unclear which perfectionism dimensions (if any) are risk factors for anxiety. Hence, we comprehensively meta-analyzed extant findings to test which perfectionism

dimensions confer risk for anxiety. Findings, derived from 11 longitudinal studies, including adolescent, undergraduate, community, and clinical samples, revealed concern over mistakes, doubts about actions, and to a lesser extent personal standards, predicted longitudinal increases in anxiety. However, all observed effects were marginal-to-small in magnitude. Moreover, neither socially prescribed perfectionism nor self-oriented perfectionism, predicted change in anxiety.

Perfectionistic Concerns

Consistent with hypotheses, concern over mistakes and doubts about actions at baseline predicted increased anxiety at follow-up, even after controlling for baseline anxiety. This suggests people with high concern over mistakes and people with high doubts about actions are prone to experiencing anxiety. Indeed, for people with high concern over mistakes, intense anxiety might arise from perceived or actual failures. Likewise, for people with high doubts about actions, nagging uncertainty about performance abilities may trigger anxiety in performance or evaluative situations. And this sense of personal inadequacy may make everyday life more anxiety-provoking for people with high concern over mistakes and people with high doubts about actions. Confidence in our results is augmented by the longitudinal nature of studies included in our meta-analysis, and by convergence with theoretical accounts positing that concern over mistakes and doubts about actions are stable personality traits that predispose emotional distress (Smith et al., 2016).

Even so, contrary to hypotheses, socially prescribed perfectionism's relationship with follow-up anxiety, after controlling for baseline anxiety, was non-significant. Accordingly, our results highlight a need for additional studies to elucidate this relationship. Although cross-sectional relationships suggest socially prescribed perfectionism and anxiety symptoms co-occur,

our study found limited support for the contention that socially prescribed perfectionism confers risk for anxiety. Nonetheless, a relationship between socially prescribed perfectionism and anxiety may only emerge under certain conditions. This assertion is consistent with Hewitt and Flett's (2002) view of daily stressors as triggering emotional distress in perfectionistic individuals (Klibert et al., 2015). Indeed, analyses accounting for daily stressors, negative life events, and other potential moderators (e.g., coping) of the perfectionism-anxiety relationship may be essential for clarifying the link between socially prescribed perfectionism and anxiety (Dunkley, Sanislow, Grilo, & McGlashan, 2006).

Perfectionistic Strivings

Given inconsistent findings (e.g., Antony et al., 1998), and the contentiously debated suggestion that perfectionistic strivings are adaptive (e.g., Stoeber & Otto, 2006), we attempted to answer the question, "Do personal standards and self-oriented perfectionism protect against, or increase risk for, anxiety symptoms?" Our data provided an equivocal answer to this question, with a non-significant relationship between self-oriented perfectionism and follow-up anxiety and a significant, but non-substantive, positive associations between personal standards and follow up anxiety. Accordingly, as with socially prescribed perfectionism, our findings highlight the need for additional studies testing whether perfectionistic strivings confer risk for anxiety.

In particular, our equivocal findings regarding the perfectionistic strivings-anxiety link may stem from the included studies assessing perfectionistic strivings and perfectionistic concerns in the realm of their separate, rather than combined, contribution (Gaudreau & Verner-Filion, 2012). Indeed, perfectionistic strivings may only confer risk for anxiety in the presence of high perfectionistic concerns. Similarly, ample evidence suggests perfectionistic concerns suppress the relationship between perfectionistic strivings and positive outcomes (see Hill,

Huelsman, & Araujo, 2010). As such, failure to control of perfectionistic concerns when investigating the extent to which perfectionistic strivings predict change in anxiety could obscure distinct, possibly negative, relationships (Stoeber & Gaudreau, 2017). Nonetheless, perfectionistic strivings were recently posited as a transdiagnostic factor in psychopathology (Egan et al., 2011; Limburg et al., 2016). Hence, it is advisable to be wary of perfectionistic strivings in clinical settings. Even so, for now our results suggest that perfectionistic strivings are relatively benign with regard to anxiety.

Limitations of Overall Literature

Meta-analysis offers insight into the current state of a body of knowledge, as limitations in empirical studies are translated into limitations of the meta-analysis, and directions for future research become apparent. One such limitation in the perfectionism-anxiety literature is a heavy reliance on cross-sectional studies. This is problematic given that cross-sectional studies are not adequate for assessing temporal precedence and have the potential to obscure relationships that emerge over time. Research in this area would benefit from more longitudinal studies, which are able to make conclusions about risk for developing anxiety over time. Additionally, increased consideration of potential confounding variables, by the assessment and the inclusion of covariates in analyses (e.g., neuroticism), would be advantageous in ensuring variables outside of the research questions do not confound analyses and misguide interpretation of results.

Our search of the literature on perfectionism and longitudinal changes in anxiety showed an overwhelming reliance on mono-source designs. Conclusions based on data collected from a single source (e.g., self-report questionnaires) are limited. This is especially problematic in the study of traits such as perfectionism, where individuals might be motivated to conceal socially undesirable tendencies (i.e., self-presentational biases could invalidate results; Klonsky &

Oltmanns, 2002). The potential for such biases can be minimized using additional or alternative methods of data collection, such as informant reports or physiological data (Sherry et al., 2013).

Lastly, since three longitudinal studies in our meta-analysis had sample sizes below 150, it appears that a portion of studies examining the link between perfectionism and anxiety are underpowered. Moving forward, it would be advisable for researchers to ensure all sample sizes are sufficiently large to detect small to moderate effects in longitudinal designs.

Limitations of the Present Study and Future Directions

Despite the advantages of meta-analysis and the strengths of our investigation, this study is not without limitations. One limitation is inherent in conceptualizing perfectionism as having two dimensions: Perfectionistic concerns were comprised of three facets (socially prescribed perfectionism, concern over mistakes, and doubts about actions) and perfectionistic strivings were comprised of two facets (self-oriented perfectionism and personal standards). It is possible perfectionistic concerns were more completely and comprehensively captured than perfectionistic strivings, and this may have influenced the magnitude of observed effects in unexpected ways. In future, analyses of perfectionism including an equivalent number of dimensions within each of the two dimensions may be preferable. As with any meta-analysis, the validity of our results also largely depends on the quality of measures used in studies included in our meta-analysis. Because of variability in questionnaires assessing perfectionism and anxiety, interpretation of results might not be as straightforward as if all studies had measured these constructs in the same way. Similarly, additional research on the perfectionism-anxiety link using the 2 X 2 model of perfectionism to examine the unique, combined, and interactive effects of perfectionistic strivings and perfectionistic concerns is needed (Gaudreau & Thomson, 2010; see also Gaudreau, 2012, 2013). Finally, included samples were diverse in terms of clinical

versus nonclinical status and age. As such, the extent to which our results are generalizable to specific populations (e.g., ethnic minorities) is unclear.

Conclusions

Our findings suggest concern over mistakes and doubts about actions confer risk for anxiety over time and highlight the need for additional research on how socially prescribed perfectionism and perfectionistic strivings may influence anxiety.

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Table 1
Characteristics of longitudinal studies included in the meta-analysis

	N	Sample type	Mean age	Time lag	Attrition %	Female %	Ethnic %	Status	Perfectionism	Anxiety
					Sample				**Measure**	
Akram et al. (2015)	76	community members	25.30	12.00	25.00	80.00	7.90	A	FMPS-COM FMPS-DAA HMPS-SPP FMPS-PS HMPS-SOP	HADS-Anx
Damian et al. (2016)	489	middle and high school students	15.90	9.00	52.00	54.00	0.00	A	FMPS-COM FMPS-DAA CAPS-SPP FMPS-PS CAPS-SOP	SCARED
Einstein et al. (2000)	508	high school students	17.60	2.00	21.85	65.80	NR	A	HMPS-SPP HMPS-SOP	DASS-Anx
Flaxman et al. (2012)	77	university academics	46.00	2.00	30.63	64.00	NR	A	FMPS-DAA	AWBS-Anx
Herman et al. (2013)	547	elementary school students	6.22	72.00	NR	NR	100.00	A	CAPS-SPP CAPS-SOP-critical	BHIF-YC-C-Anx
Joiner and Schmidt (1995)	174	university undergraduates	19.80	0.75	NR	62.64	40.00	A	EDI-PS-SPP EDI-PS-SOP	BAI
Mandel et al. (2015)	150	community members	41.02	48.00	32.74	70.00	25.00	A	FMPS-COM HMPS-SPP FMPS-PS HMPS-SOP	MASQ-GDA MASQ-AA
O'Connor et al. (2010)	515	high school students	15.20	6.00	30.12	49.80	NR	A	CAPS-14-SPP CAPS-14-SOP-critical CAPS-14-SOP-striving	HADS-Anx

Oddo-Sommerfeld et al. (2016)	266	community members	32.35	4.50	10.44	100.00	NR	A	MPS-German-COM MPS-German-DAA MPS-German-PS	STADI-Anx
Rasmussen (2005) study 4	40	psychiatric patients	NR	1.50	37.50	57.50	NR	D	HMPS-SPP HMPS-SOP	HADS-Anx
Sherry et al. (2014)	302	university undergraduates	20.84	6.00 / 12.00	27.80	72.60	9.90	A	FMPS-SF-COM FMPS-DAA HMPS-SF-SPP	MASQ-AA

Note. **NR** = not reported; *N* = total number of participants; time lag is expressed in months; **Ethnic %** = percentage ethnic minority; **status** = publication status of study; **A** = article; **D** = dissertation; **FMPS** = Frost's et al.'s (1990) Multidimensional Perfectionism Scale; **COM** = concern over mistakes; **DAA** = doubts about actions; **PS** = personal standards; **HMPS** = Hewitt and Flett's (1991) Multidimensional Perfectionism Scale; **SOP** = self-oriented perfectionism; **SPP** = socially prescribed perfectionism; **CAPS** = Flett et al.'s (2000) Child and Adolescent Perfectionism Scale; **SOP-critical** = self-oriented perfectionism critical subscale; **SOP-striving** = self-oriented perfectionism striving subscale; **EDI-PS** = Garner et al.'s (1983) Eating Disorder Inventory Perfectionism Subscale; **MPS-German** = Mehrdimensionale Perfektionismus-Skala von Frost et al. (1990) and Altstötter-Gleichand and Bergemann (2006), the German version of Frost's et al.'s (1990) Multidimensional Perfectionism Scale; **CAPS-14** = O'Connor et al.'s (2009) Child and Adolescent Perfectionism Scale 14-item version; **HADS-Anx** = anxiety subscale of Zigmond and Snaith's (1983) Anxiety and Depression Scale; **SCARED** = self-report version of Birmaher et al.'s (1999) Screen for Child Anxiety Related Emotional Disorders; **DASS-Anx** = anxiety subscale of Lovibond and Lovibond's (1995) Depression Anxiety Stress Scales; **AWBS-Anx** = anxiety subscale of Warr's (1990) Affective Well-Being scales; **BHIF-YC-C-Anx** = Ialongo et al.'s (1999) Baltimore How I Feel-Young Child Version, Child Report, anxiety scale; **BAI** = Beck et al.'s (1988) Beck Anxiety Inventory; **MASQ** = Watson and Clark's (1991) Mood and Anxiety Symptom Questionnaire Short Form; **GDA** = general distress anxious subscale; **AA** = anxious arousal subscale; **STADI-Anx** = Laux et al.'s (2013) State-Trait Anxiety Depression Inventory, state anxiety subscale; **SF** = short form.

Table 2

Relationships between perfectionism dimensions and anxiety symptoms

	Outcome	$^rCM_1,A_1$	$^rCM_2,A_2$	$A_1{\to}A_2$	$A_1{\to}A_3$	$A_2{\to}A_3$	$CM_1{\to}A_2$	$CM_1{\to}A_3$	$CM_2{\to}A_3$	$CM{\to}A_{av}$
					Concern over mistakes					
Akram et al. (2015)	HADS	.35	—	—	.83	—	—	.01	—	.01
	Overall	**.35**	**—**	**—**	**.83**	**—**	**—**	**.01**	**—**	**.01**
Damian et al. (2016)	SCA	.48	.51	.55	.48	.65	.20	.16	.04	.13
	Overall	**.48**	**.51**	**.55**	**.48**	**.65**	**.20**	**.16**	**.04**	**.13**
Mandel et al. (2015)	MAS-G	.33	—	—	.49	—	—	.09	—	.09
	MAS-A	.36	—	—	.55	—	—	.05	—	.05
	Overall	**.35**	**—**	**—**	**.52**	**—**	**—**	**.07**	**—**	**.07**
Oddo-Sommerfeld et al. (2016)	STADI	.39	—	—	.37	—	—	.17	—	.17
	Overall	**.39**	**—**	**—**	**.37**	**—**	**—**	**.17**	**—**	**.17**
Sherry et al. (2014)	MAS-A	.23	.30	.67	.60	.69	.04	.13	.05	.07
	Overall	**.23**	**.30**	**.67**	**.60**	**.69**	**.04**	**.13**	**.05**	**.07**

	Outcome	$^rDA_1,A_1$	$^rDA_2,A_2$	$A_1{\to}A_2$	$A_1{\to}A_3$	$A_2{\to}A_3$	$DA_1{\to}A_2$	$DA_1{\to}A_3$	$DA_2{\to}A_3$	$DA{\to}A_{av}$
					Doubts about actions					
Akram et al. (2015)	HADS	.39	—	—	.76	—	—	.17	—	.17
	Overall	**.39**	**—**	**—**	**.76**	**—**	**—**	**.17**	**—**	**.17**
Damian et al. (2016)	SCA	.55	.54	.54	.46	.63	.18	.19	.07	.15
	Overall	**.55**	**.54**	**.54**	**.46**	**.63**	**.18**	**.19**	**.07**	**.15**
Flaxman et al. (2012)	AWBS	.34	—	—	.43	—	—	.25	—	.25
	Overall	**.34**	**—**	**—**	**.43**	**—**	**—**	**.25**	**—**	**.25**
Oddo-Sommerfeld et al. (2016)	STADI	.44	—	—	.36	—	—	.16	—	.16
	Overall	**.44**	**—**	**—**	**.36**	**—**	**—**	**.16**	**—**	**.16**
Sherry et al. (2014)	MAS-A	.35	.34	.66	.64	.72	.06	-.01	-.02	.01
	Overall	**.35**	**.34**	**.66**	**.64**	**.72**	**.06**	**-.01**	**-.02**	**.01**

	Outcome	$^rSP_1,A_1$	$^rSP_2,A_2$	$A_1{\to}A_2$	$A_1{\to}A_3$	$A_2{\to}A_3$	$SP_1{\to}A_2$	$SP_1{\to}A_3$	$SP_2{\to}A_3$	$SP{\to}A_{av}$
					Socially prescribed perfectionism					
Akram et al. (2015)	HADS	.30	—	—	.80	—	—	.10	—	.10
	Overall	**.30**	**—**	**—**	**.80**	**—**	**—**	**.10**	**—**	**.10**
Damian et al. (2016)	SCA	.34	.34	.64	.52	.64	.01	.11	.08	.07
	Overall	**.34**	**.34**	**.64**	**.52**	**.64**	**.01**	**.11**	**.08**	**.07**
Einstein et al. (2000)	DASS	.29	—	—	.54	—	—	.09	—	.09
	Overall	**.29**	**—**	**—**	**.54**	**—**	**—**	**.09**	**—**	**.09**
Herman et al. (2013)	BHIF	.31	—	—	.18	—	—	-.01	—	-.01
	Overall	**.31**	**—**	**—**	**.18**	**—**	**—**	**-.01**	**—**	**-.01**
Joiner and Schmidt (1995)	BAI	-.01	—	—	.49	—	—	-.12	—	-.12
	Overall	**-.01**	**—**	**—**	**.49**	**—**	**—**	**-.12**	**—**	**-.12**

		rPS$_1$,A$_1$	rPS$_2$,A$_2$	A$_1$→A$_2$	A$_1$→A$_3$	A$_2$→A$_3$	PS$_1$→A$_2$	PS$_1$→A$_3$	PS$_2$→A$_3$	PS→A$_{av}$
Mandel et al. (2015)	MAS-G	.28	—	—	.49	—	—	.11	—	.11
	MAS-A	.32	—	—	.52	—	—	.14	—	.14
	Overall	**.30**	—	—	**.51**	—	—	**.13**	—	**.13**
O'Connor et al. (2010)	HADS	.36	—	—	.60	—	—	.08	—	.08
	Overall	**.36**	—	—	**.60**	—	—	**.08**	—	**.08**
Rasmussen (2005)	HADS	.33	—	—	.63	—	—	-.10	—	-.10
	Overall	**.33**	—	—	**.63**	—	—	**-.10**	—	**-.10**
Sherry et al. (2014)	MAS-A	.20	.26	.69	.63	.69	-.05	.04	.07	.01
	Overall	**.20**	**.26**	**.69**	**.63**	**.69**	**-.05**	**.04**	**.07**	**.02**

Personal standards

	Outcome	rPS$_1$,A$_1$	rPS$_2$,A$_2$	A$_1$→A$_2$	A$_1$→A$_3$	A$_2$→A$_3$	PS$_1$→A$_2$	PS$_1$→A$_3$	PS$_2$→A$_3$	PS→A$_{av}$
Akram et al. (2015)	HADS	.23	—	—	.83	—	—	.00	—	.00
	Overall	**.23**	—	—	**.83**	—	—	**.00**	—	**.00**
Damian et al. (2016)	SCA	.23	.23	.62	.54	.66	.11	.10	.05	.09
	Overall	**.23**	**.23**	**.62**	**.54**	**.66**	**.11**	**.10**	**.05**	**.09**
Mandel et al. (2015)	MAS-G	.13	—	—	.50	—	—	.14	—	.14
	MAS-A	.09	—	—	.56	—	—	.12	—	.12
	Overall	**.11**	—	—	**.53**	—	—	**.13**	—	**.13**
Oddo-Sommerfeld et al. (2016)	STADI	.20	—	—	.42	—	—	.07	—	.07
	Overall	**.20**	—	—	**.42**	—	—	**.07**	—	**.07**

Self-oriented perfectionism

	Outcome	rSO$_1$,A$_1$	rSO$_2$,A$_2$	A$_1$→A$_2$	A$_1$→A$_3$	A$_2$→A$_3$	SO$_1$→A$_2$	SO$_1$→A$_3$	SO$_2$→A$_3$	SO→A$_{av}$
Akram et al. (2015)	HADS	.23	—	—	.82	—	—	.05	—	.05
	Overall	**.23**	—	—	**.82**	—	—	**.05**	—	**.05**
Damian et al. (2016)	SCA	.33	.27	.62	.54	.66	.06	.05	.02	.04
	Overall	**.33**	**.27**	**.62**	**.54**	**.66**	**.06**	**.05**	**.02**	**.04**
Einstein et al. (2000)	DASS	.08	—	—	.56	—	—	.02	—	.02
	Overall	**.08**	—	—	**.56**	—	—	**.02**	—	**.02**
Joiner and Schmidt (1995)	BAI	.06	—	—	.50	—	—	-.11	—	-.11
	Overall	**.06**	—	—	**.50**	—	—	**-.11**	—	**-.11**
Mandel et al. (2015)	MAS-G	.14	—	—	.50	—	—	.16	—	.16
	MAS-A	.13	—	—	.56	—	—	.12	—	.12
	Overall	**.14**	—	—	**.53**	—	—	**.14**	—	**.14**
Rasmussen (2005)	HADS	.18	—	—	.60	—	—	.01	—	.01
	Overall	**.18**	—	—	**.60**	—	—	**.01**	—	**.01**

Self-oriented perfectionism – critical

	Outcome	rSO$_1$,A$_1$	rSO$_2$,A$_2$	A$_1$→A$_2$	A$_1$→A$_3$	A$_2$→A$_3$	SO$_1$→A$_2$	SO$_1$→A$_3$	SO$_2$→A$_3$	SO→A$_{av}$
Herman et al. (2013)	BHIF	.40	—	—	.17	—	—	.02	—	.02
	Overall	**.40**	—	—	**.17**	—	—	**.02**	—	**.02**

O'Connor et al. (2010)	HADS	.35	—	—	.59	—	—	.11	—	.11
	Overall	**.35**	—	—	**.59**	—	—	**.11**	—	**.11**

	Self-oriented perfectionism – striving								
	Outcome	$^rSO_1,A_1$	$^rSO_2,A_2$	$A_1{\rightarrow}A_2$	$A_1{\rightarrow}A_3$	$A_2{\rightarrow}A_3$	$SO_1{\rightarrow}A_2$	$SO_1{\rightarrow}A_3$	$SO_2{\rightarrow}A_3$	$SO{\rightarrow}A_{av}$
O'Connor et al. (2010)	HADS	.00	—	—	.63	—	—	.01	—	.01
	Overall	**.00**	—	—	**.63**	—	—	**.01**	—	**.01**

Note. **CM** = concern over mistakes; **A** = anxiety; **DA** = doubts about actions; **SP** = socially prescribed perfectionism; **PS** = personal standards; **SO** = self-oriented perfectionism; x_1 = time 1 variable; x_2 = time 2 variable; x_3 = time 3 variable; $^rx_1, ^ry_1$= bivariate correlation between time 1 variables; $^rx_2, ^ry_2$= bivariate correlation between time 2 variables; **COM$_1{\rightarrow}$ANX$_2$** = standardized beta for time 1 concern over mistakes predicting time 2 anxiety symptoms; **COM$_1{\rightarrow}$ANX$_3$** = standardized beta for time 1 concern over mistakes predicting time 3 anxiety symptoms; **COM$_2{\rightarrow}$ANX$_3$** = standardized beta for time 2 concern over mistakes predicting time 3 anxiety symptoms; **COM$\rightarrow$ANX$_{AV}$** = the standardized weighted average for concern over mistakes predicting future anxiety symptoms averaged across all waves; **ANX$_1{\rightarrow}$ANX$_2$** = standardized beta for time 1 anxiety symptoms predicting time 2 anxiety symptoms; **ANX$_1{\rightarrow}$ANX$_3$** = standardized beta for time 1 anxiety symptoms predicting time 3 anxiety symptoms; **ANX$_2{\rightarrow}$ANX$_3$** = standardized beta for time 2 anxiety symptoms predicting time 3 anxiety symptoms; **HADS** = anxiety subscale of Zigmond and Snaith's (1983) Anxiety and Depression Scale; **SCA** = self-report version of Birmaher et al's (1999) Screen for Child Anxiety Related Emotional Disorders; **MAS** = Watson and Clark's (1991) Mood and Anxiety Symptom Questionnaire Short Form; **MAS-G** = MAS general distress anxious subscale; **MAS-A** = MAS anxious arousal subscale; **STADI** = state anxiety subscale of Laux et al.'s (2013) State-Trait Anxiety Depression Inventory; **AWBS** = anxiety subscale of Warr's (1990) Affective Well-Being scales; **DASS** = anxiety subscale of Lovibond and Lovibond's (1995) Depression Anxiety Stress Scales; **BAI** = Beck et al.'s (1988) Beck Anxiety Inventory; **BHIF** = anxiety scale of Ialongo et al.'s (1999) Baltimore How I Feel-Young Child Version, Child Report.

Table 3

Summary of effect sizes for the relationship between perfectionism dimensions and anxiety symptoms

Variable	k	N	r^+	95% CI	Q_T	I^2 (%)	Egger's intercept	95% CI	K^{TF}	Trim and fill estimates r^+ [95% CI]
Perfectionistic Concerns										
Concern over mistakes										
$^rCOM,ANX$	5	1,283	.38***	[.28, .47]	14.56**	72.55	-2.84	[-12.35, 6.66]	0	.38 [.28, .47]
ANX→ANX	5	1,264	.60***	[.47, .70]	39.14***	89.78	3.75	[-11.09, 18.60]	0	.60 [.47, .70]
COM→ANX	**5**	**1,264**	**.11***	**[.06, .17]**	**2.44**	**0.00**	**-1.36**	**[-4.59, 1.88]**	**0**	**.11 [.06, .17]**
Doubts about actions										
$^rDAA,ANX$	5	1,210	.43***	[.33, .52]	14.97**	73.28	-3.00	[-10.56, 4.56]	0	.43 [.33, .52]
ANX→ANX	5	1,191	.57***	[.42, .68]	36.35***	89.00	1.05	[-12.52, 14.63]	0	.55 [.42, .68]
DAA→ANX	**5**	**1,191**	**.13**	**[.05, .20]**	**5.94**	**32.61**	**1.01**	**[-4.21, 6.23]**	**2**	**.11 [.04, .18]**
Socially prescribed perfectionism[a]										
$^rSPP,ANX$	9	2,797	.27***	[.21, .33]	23.38**	64.25	-2.02	[-5.52, 1.48]	0	.27 [.21, .33]
ANX→ANX	9	2,655	.57***	[.45, .67]	130.45***	93.87	3.20	[-5.32, 11.72]	3	.50 [.38, .60]
SPP→ANX	**9**	**2,665**	**.04**	**[.00, .09]**	**9.91**	**19.24**	**-0.45**	**[-2.89, 1.99]**	**0**	**.04 [.00, .09]**
Perfectionistic Strivings										
Personal Standards										
$^rPS,ANX$	4	981	.20***	[.14, .26]	1.79	0.00	-0.96	[-6.55, 4.62]	0	.20 [.14, .26]
ANX→ANX	4	962	.70***	[.50, .83]	63.35	95.26	6.98	[-20.27, 34.23]	0	.70 [.50, 83]
PS→ANX	**4**	**962**	**.08***	**[.02, .15]**	**0.76**	**0.00**	**-0.44**	**[-3.97, 3.08]**	**0**	**.08 [.02, .15]**
Self-oriented perfectionism[b]										
$^rSOP,ANX$	8	2,495	.20***	[.10, .30]	42.05***	83.36	-1.53	[-7.39, 4.31]	0	.20 [.10, .30]
ANX→ANX	8	2,363	.56***	[.42, .68]	130.35***	94.63	3.20	[-6.33, 12.73]	3	.47 [.34, .58]
SOP→ANX	**8**	**2,363**	**.03**	**[-.01, .07]**	**5.85**	**0.00**	**-0.14**	**[-2.27, 1.98]**	**0**	**.03 [-.01, .07]**

Note. k = number of studies; N = total number of participants in the k samples; r^+ = weighted mean r; CI = confident interval; Q_T = measure of heterogeneity of effect sizes; I^2 = percentage of heterogeneity; **Egger's intercept** = Egger's test of regression to the intercept; k^{TF} = number of imputed studies as part of trim and fill method; **COM** = concern over mistakes; **DAA** = doubts about actions; **SPP** = socially prescribed perfectionism; **PS** = personal standards; **SOP** = self-oriented perfectionism; **ANX** = anxiety; $^rCOM,ANX$ = bivariate correlation between concern over mistakes and anxiety; **ANX→ANX** = standardized beta for baseline anxiety symptoms predicting follow-up anxiety symptoms; **COM→ANX** = standardized beta for concern over mistakes predicting follow-up anxiety symptoms; **HMPS** = Hewitt and Flett's (1991) Multidimensional Perfectionism Scale; **CAPS** = Flett et al.'s (2000) Child and Adolescent Perfectionism Scale; **SOP-C** = self-oriented perfectionism – critical; **SOP-S** = self-oriented perfectionism – striving; **EDI** = Garner et al.'s (1983) Eating Disorder Inventory Perfectionism Subscale. [a]Aggregate of HMPS-SPP, CAPS-SPP, and EDI-SPP; [b]Aggregate of HMPS-SOP, CAPS-SOP, CAPS-SOP-C, CAPS-SOP-S, CAPS-SOP, and EDI-SOP
*p < .05; **p < .01; ***p < .001.

Supplemental Material A: Excluded Studies

Studies marked with an asterisk were excluded from the present meta-analysis.

Beck, A., Epstein, N., Brown, G., & Steer, R. (1988). An inventory for measuring clinical

anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*,

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young adults. *Journal of Abnormal Psychology, 85*, 383–389.

*Bonvanie, I. J., Rosmalen, J. G., van Rhede van der Kloot, C. M., Oldehinkel, A. J., & Janssens,

K. A. (2015). Short report: Functional somatic symptoms are associated with

perfectionism in adolescents. *Journal of Psychosomatic Research, 79*, 328-330.

Burns, D. D. (1980). The perfectionist's script for self-defeat. *Psychology Today, 14*, 34–52.

Burns, D. D. (1983). The spouse who is a perfectionist. *Medical Aspects of Human Sexuality, 17*,

219–230.

Cochrane, R., & Robertson, A. (1973). The life events inventory: A measure of the relative

severity of psychosocial stressors. *Journal of Psychosomatic Research, 17*, 135–139.

Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins

Symptom Checklist (HSCL): A self-report symptom inventory. *Behavioral Science, 19*,

1–15.

*Dunkley, D. M., Mandel, T., & Ma, D. (2014). Perfectionism, neuroticism, and daily stress

reactivity and coping effectiveness 6 months and 3 years later. *Journal of Counseling

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Dunkley, D. M., Zuroff, D. C., & Blankstein, K. R. (2003). Self-critical perfectionism and daily

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Personality and Social Psychology, 84, 234–252.

*Egan, S. J., van Noort, E., Chee, A., Kane, R. T., Hoiles, K. J., Shafran, R., & Wade, T. D. (2014). A randomized controlled trial of face to face versus pure online self-help cognitive behavioural treatment for perfectionism. *Behaviour Research and Therapy, 63*, 107-113.

*Enns, M. W., Cox, B. J., & Clara, I. P. (2005). Perfectionism and neuroticism: A longitudinal study of specific vulnerability and diathesis-stress models. *Cognitive Therapy and Research, 29*, 463-478.

Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: A 'transdiagnostic' theory and treatment. *Behaviour Research and Therapy, 41*, 509-528.

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449-468.

Garner, D. M., Olmsted, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders, 2*, 15-34.

*Gautreau, C. M., Sherry, S. B., Mushquash, A. R., & Stewart, S. H. (2015). Is self-critical perfectionism an antecedent of or a consequence of social anxiety, or both? A 12-month, three-wave longitudinal study. *Personality and Individual Differences, 82*, 125-130.

*Glover, D. S., Brown, G. P., Fairburn, C. G., & Shafran, R. (2007). A preliminary evaluation of cognitive-behaviour therapy for clinical perfectionism: A case series. *British Journal of Clinical Psychology, 46*, 85-94.

Hart, T. A., Mora, D. B., Palyo, S. A., Fresco, D. M., Holle, C., & Heimberg, R. G. (2008).

Development and examination of the social appearance anxiety scale. *Assessment,*

15, 48-59.

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts. *Journal of*

Personality and Social Psychology, *60*, 456-470.

*Holm-Denoma, J. M., Gordon, K. H., Bardone-Cone, A. M., Vohs, K. D., Abramson, L. Y.,

Heatherton, T. F., & Joiner, T. E. (2005). A test of an interactive model of bulimic

symptomatology in adult women. *Behavior Therapy, 36*, 311-321.

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*Levinson, C. A., & Rodebaugh, T. L. (2016). Clarifying the prospective relationships between

social anxiety and eating disorder symptoms and underlying vulnerabilities. *Appetite, 107*,

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Liebowitz, M. R. (1987). Social phobia. *Modern Problems of Pharmacopsychiatry, 22*,

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and Anxiety Inventories. *Behaviour Research and Therapy, 33*, 335-343.

Mandel, T., Dunkley, D. M., & Moroz, M. (2015). Self-critical perfectionism and depressive and

anxious symptoms over 4 years: The mediating role of daily stress reactivity. *Journal of*

counseling psychology, 62, 703-717.

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia

scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy, 36*, 455-

470.

*Procopio, C. A., Holm-Denoma, J. M., Gordon, K. H., & Joiner, T. E. (2006). Two–three-year

    stability and interrelations of bulimotypic indicators and depressive and anxious

    symptoms in middle-aged women. *International Journal of Eating Disorders, 39*, 312-

    319.

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    Burns ni yoru kanzenshugi-shakudo wo motiite [A study of relationship between

    perfectionism and depression using the perfectionism scale constructed by Burns]. *Bulletin*

    of Nara University of Education, 43, 213–223.

Sherry, S. B., Hewitt, P. L., Besser, A., McGee, B. J., & Flett, G. L. (2004). Self-oriented and

    socially prescribed perfectionism in the Eating Disorder Inventory Perfectionism

    subscale. *International Journal of Eating Disorders*, *35*, 69-79.

Slaney, R. B., Rice, K., Mobley, M., Trippi, J., & Ashby, J. (2001). The Revised Almost Perfect

    Scale. *Measurement and Evaluation in Counseling and Development*, *34*, 130-145.

Snell, W. E., Jr. (1997). *The Multidimensional Sexual Perfectionism Questionnaire (MSPQ),*

    Section I. Retrieved from http://www4.semo.edu/snell/scales/MSPQ.htm.

Snell, W. E., Jr. (2011). Multidimensional Sexual Self-Concept Questionnaire. In T. D. Fisher,

    C. M. Davis, W. L. Yarber, & S. L. Davis (Eds.), *Handbook of sexuality-related measures*

    (3rd ed., pp. 537–540). New York: Routledge.

*Steele, A. L, & Wade, T. D. (2008). A randomised trial investigating guided self-help to reduce

    perfectionism and its impact on bulimia nervosa: A pilot study. *Behaviour Research and*

    Therapy, 46, 1316-1323.

*Stoeber, J., & Harvey, L. N. (2016). Multidimensional sexual perfectionism and female sexual

    function: A longitudinal investigation. *Archives of Sexual Behavior, 45*, 2003-2014.

Sumi, K. (1997). Optimism, social support, stress and physical and psychological well-being in

Japanese women. *Psychological Reports, 81*, 299–306.

*Sumi, K., & Kanda, K. (2002). Relationship between neurotic perfectionism, depression,

anxiety, and psychosomatic symptoms: A prospective study among Japanese men.

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T. E. (2001). Perfectionism, body dissatisfaction, and self-esteem: An interactive model

of bulimic symptom development. *Journal of Social and Clinical Psychology, 20*, 476-

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Watson, D., & Clark, L. A. (1991). *The Mood and Anxiety Symptom Questionnaire*. Iowa City,

IA: Department of Psychology, University of Iowa.

Weissman, A. N., & Beck, A. T. (1978, March). *Development and validation of the

Dysfunctional Attitude Scale: A preliminary investigation*. Paper presented at the 62nd

annual meeting of the American Educational Research Association, Toronto, ON,

Canada.

Table A1

Characteristics of studies excluded from the meta-analysis

		Sample					Measures		Reason for exclusion
	N	Sample type	Mean age	Female %	Ethnic %	Status	Perfectionism	Anxiety	
Bonvanie et al. (2015)	1,878	adolescent	16.2	NR	NR	A	YSR-Perfect	AD-YSR	Perfectionism assessed with one item: "I have the feeling I have to be perfect."
Dunkley et al. (2014)	85	community[a]	NR	71.8	NR	A	MPS-SOP MPS-SPP FMPS-COM APS-R-DIS DEQ-SC DAS-SC	ES	Measured event stress.
Egan et al. (2014)	52	treatment[b]	39.9	58.0	NR	A	MPS-COM CPQ DAS-SC	DASS-A	Treatment study.
Enns et al. (2005)	139	university[c]	23.5	43.2	NR	A	MPS-SF-SOP MPS-SF-OOP MPS-SF-SPP MPS-COM MPS-DAA	LEI	Measured life event stress.
Gautreau et al. (2015)	301	university[c]	20.9	71.1	10.0	A	MPS-COM MPS-DAA	LSAS-A SIAS SPS	Measured social anxiety.
Glover et al. (2007)	9	psychiatric[d]	33.0	77.8	NR	A	MPS-SOP MPS-OOP MPS-SPP CPQ DAS-P	BAI	Treatment study.
Holm-Denoma et al. (2005)	150	health workers[e]	47.4	100.0	10.0	A	EDIP	BAI-SF	Used the EDIP.[f]

Levinson and Rodebaugh (2016)	300	university[c]	18.0[g]	100.0	39.3	A	FMPS-COM FMPS-DAA FMPS-PC FMPS-PE FMPS-PPS	BFNE SAAS SIAS	Measured social anxiety.
Procopio et al. (2006)	150	health workers[e]	45.2	100.0	10.0	A	EDIP	BAI-SF	Same sample as Holm-Denoma et al. (2005).
Steele and Wade (2008)	48	psychiatric[d]	26.0	98.0	NR	A	FMPS-COM FMPS-PS	DASS-A	Treatment study.
Stoeber and Harvey (2016)	366	university[c] community[a]	23.5	100.0	27.3	A	MSPQ-SO MSPQ-PO MSPQ-PP MSPQ-SP	MSSCQ-SA	Measured sexual perfectionism and sexual anxiety.
Sumi and Kanda (2002)	138	university[c]	21.5	0.0	100.0	A	BPS-J	HSC-Anx	BPS-J used in only one study.
Vohs et al. (2001)	70	university[c]	NR	100.0	28.0	A	EDIP	BAI	Used the EDIP.[e]

Note. **NR** = not reported; *N* = total number of participants; **Ethnic %** = percentage ethnic minority; **status** = publication status of the study; **A** = article; **D** = dissertation; **YSR–Perfect** = one item of the Youth Self-Report measuring perfection; **AD–YSR** = Anxious/Depressed scale of the Youth Self-Report; **MPS =** Hewitt and Flett's (1991) Multidimensional Perfectionism Scale; **SOP** = self-oriented perfectionism; **OOP** = other-oriented perfectionism; **SPP** = socially prescribed perfectionism; **FMPS =** Frost et al.'s (1990) Multidimensional Perfectionism Scale; **COM** = concern over mistakes; **DAA** = doubts about actions; **PC =** parental criticism; **PE =** parental expectations; **PS =** personal standards; **PPS =** pure personal standards; **APS–R =** Slaney et al.'s (2001) Almost Perfect Scale-Revised; **DIS** = discrepancy; **HS** = high standards; **DEQ** = Blatt et al.'s (1976) Depressive Experiences Questionnaire; **SC** = self-criticism; **DAS =** Weissman and Beck's (1978) Dysfunctional Attitude Scale; **P** = perfectionism; **ES** = event stress question from measure of daily bothersome events (Dunkley et al., 2003); **MASQ** = Watson and Clark's (1991) Mood and Anxiety Symptom Questionnaire Short Form; **GDA** = MASQ general distress anxious symptoms scale; **AA** = MASQ anxious arousal scale; **CPQ** = Fairburn et al.'s (2003) Clinical Perfectionism Questionnaire; **DASS–A** = Lovibond and Lovibond's (1995) Depression Anxiety Stress Scale anxiety subscale; **SF** = short form of measure; **LEI** = Cochrane and Robertson's (1973) Life Events Inventory; **LSAS–A =** Liebowitz' (1987) Liebowitz Social Anxiety Scale avoidance subscale; **SIAS** = Mattick and Clarke's (1998) Social Interaction Anxiety Scale; **SPS** = Mattick and Clarke's (1998) Social Phobia Scale; **BAI** = Beck et al.'s (1988) Beck Anxiety Inventory; **EDIP** = Garner et al.'s (1983) Eating Disorder Inventory perfectionism subscale; **BFNE** = Leary's (1983) Brief Fear of Negative Evaluation scale; **SAAS** = Hart et al.'s (2008) Social Appearance Anxiety Scale; **MSPQ** = Snell's (1997) Multidimensional Sexual Perfectionism Questionnaire; **SO** = self-oriented; **PO** = partner-oriented; **PP** = partner-prescribed; **SP** = socially-prescribed; **MSSCQ–SA** = Snell's (2011) Multidimensional Sexual Self-Concept Questionnaire sexual anxiety subscale; **BPS–J** = Sakurai and Otani's (1994) Japanese version of Burns Perfectionism Scale (Burns 1980, 1983); **HSC–Anx** = Sumi's (1997) Japanese version of Derogatis et al.'s (1974) Hopkins Symptom Checklist anxiety subscale.

[a]Community adults

[b]People seeking treatment for difficulties with perfectionism

[c]University undergraduates

[d]Psychiatric patients

[e]Health professionals (e.g., social workers, dentists, nurses, counselors, etc.)

[f]The EDIP was excluded from the present meta-analysis in consideration of research suggesting the EDIP is problematic due to a factor structure composed of self-oriented perfectionism items and social prescribed perfectionism items (see Sherry, Hewitt, Besser, McGee, & Flett, 2004).

[g]The mean age was not reported; the median age is recorded here.

Supplemental Material B: Funnel Plots with Imputed Studies

Funnel Plot of Standard Error by Fisher's Z
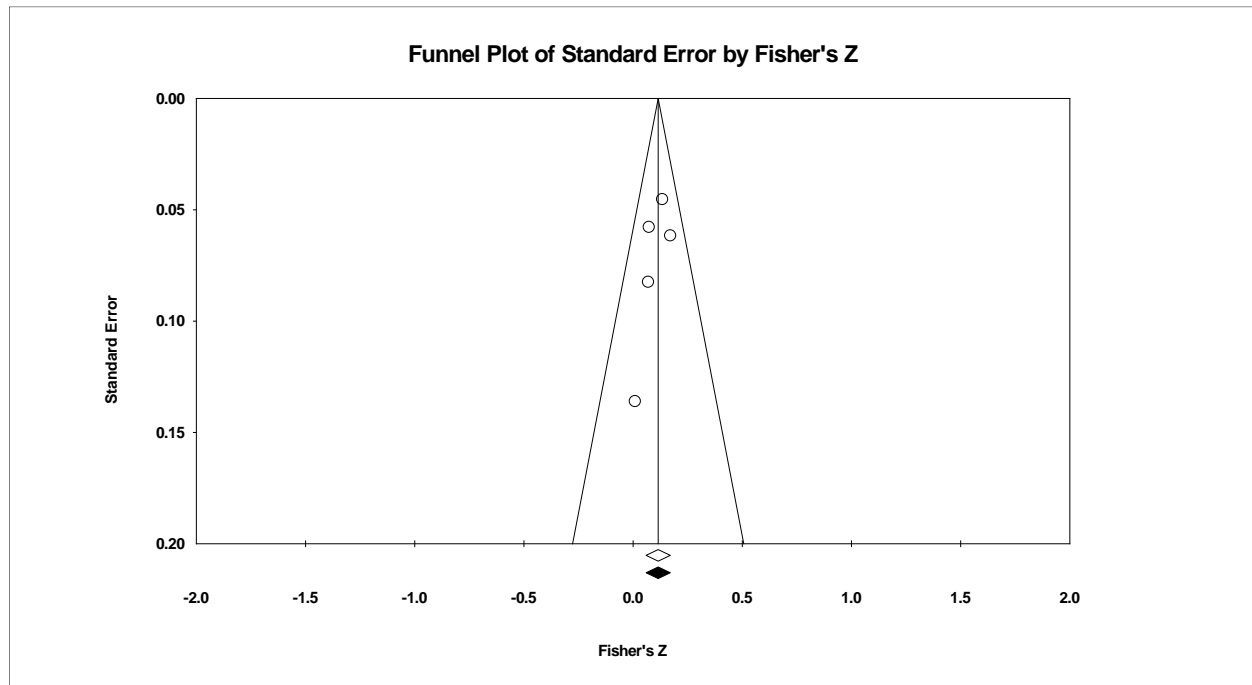
B1. Funnel plot for the relationship between baseline concern over mistakes and follow up anxiety, controlling for baseline anxiety. Open circles correspond to observed point estimates. The open diamond corresponds to the overall observed point estimates. The filled in circles correspond to overall imputed point estimates. The filled in diamond corresponds to the imputed point estimate. The expected direction of missing studies was specified as being to the left of the mean.
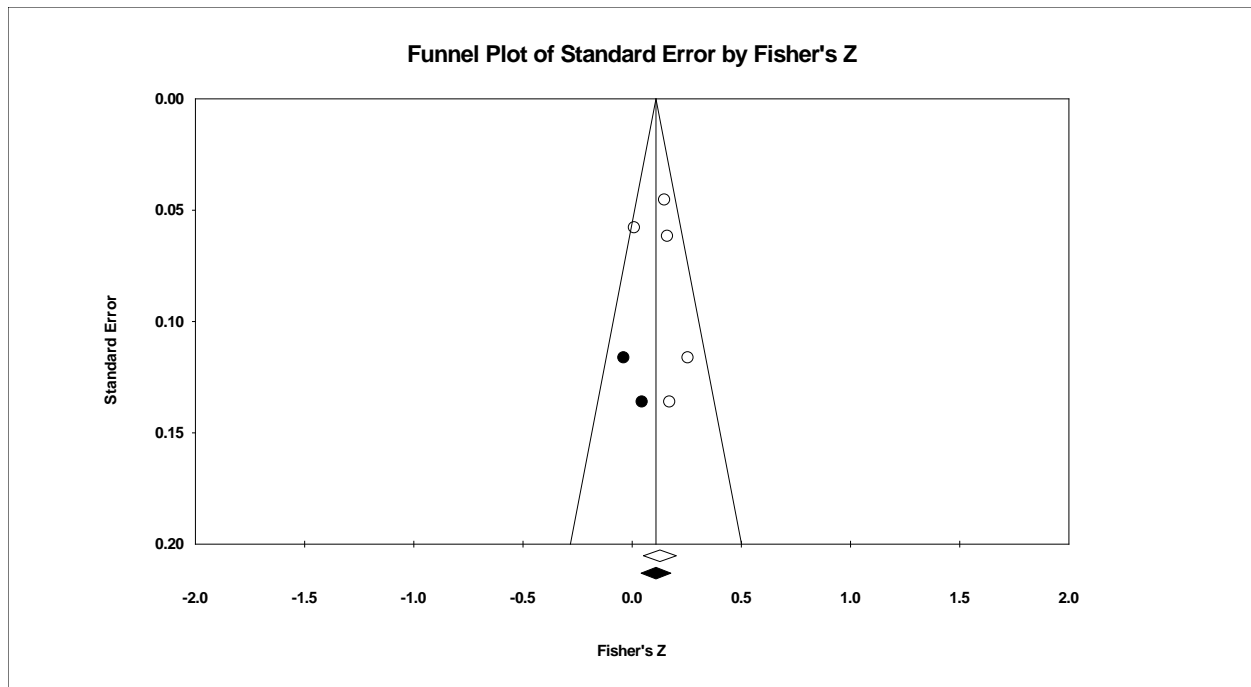
B2. Funnel plot for the relationship between baseline doubts about actions and follow up anxiety, controlling for baseline anxiety. Open circles correspond to observed point estimates. The open diamond corresponds to the overall observed point estimates. The filled in circles correspond to overall imputed point estimates. The filled in diamond corresponds to the imputed point estimate. The expected direction of missing studies was specified as being to the left of the mean.

Funnel Plot of Standard Error by Fisher's Z
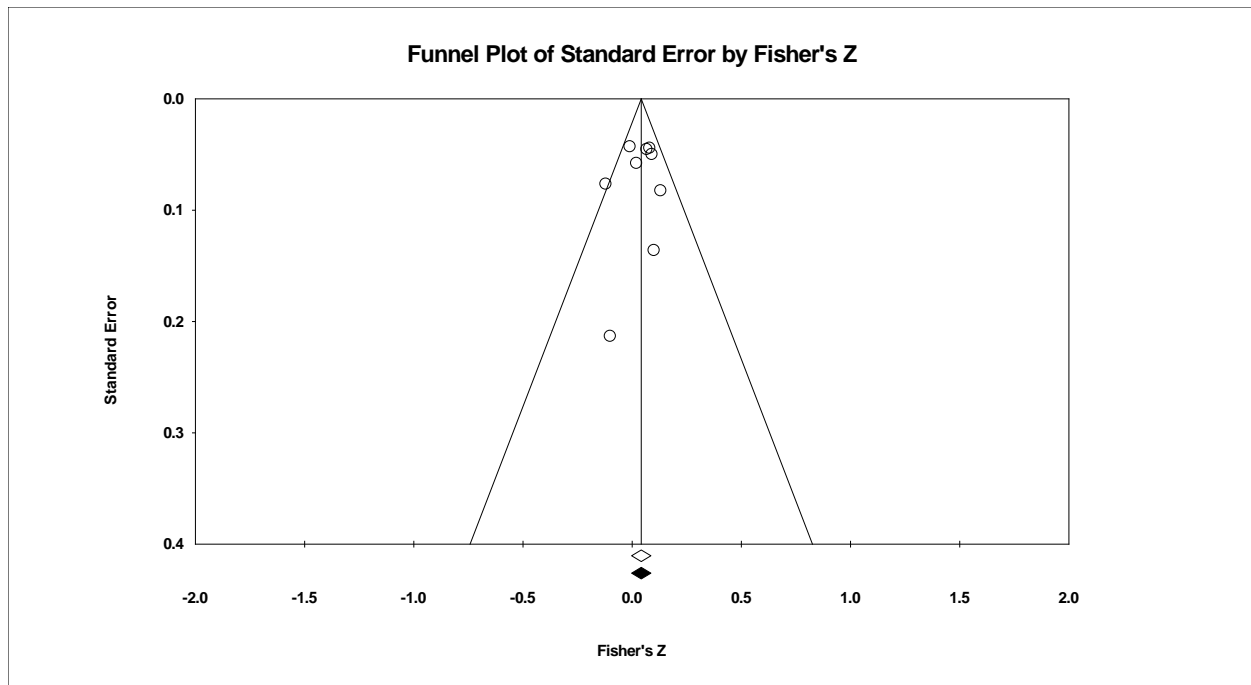
B3. Funnel plot for the relationship between baseline socially prescribed perfectionism and follow up anxiety, controlling for baseline anxiety. Open circles correspond to observed point estimates. The open diamond corresponds to the overall observed point estimates. The filled in circles correspond to overall imputed point estimates. The filled in diamond corresponds to the imputed point estimate. The expected direction of missing studies was specified as being to the left of the mean.

B4. Funnel plot for the relationship between baseline personal standards and follow up anxiety, controlling for baseline anxiety. Open circles correspond to observed point estimates. The open diamond corresponds to the overall observed point estimates. The filled in circles correspond to overall imputed point estimates. The filled in diamond corresponds to the imputed point estimate. The expected direction of missing studies was specified as being to the left of the mean.
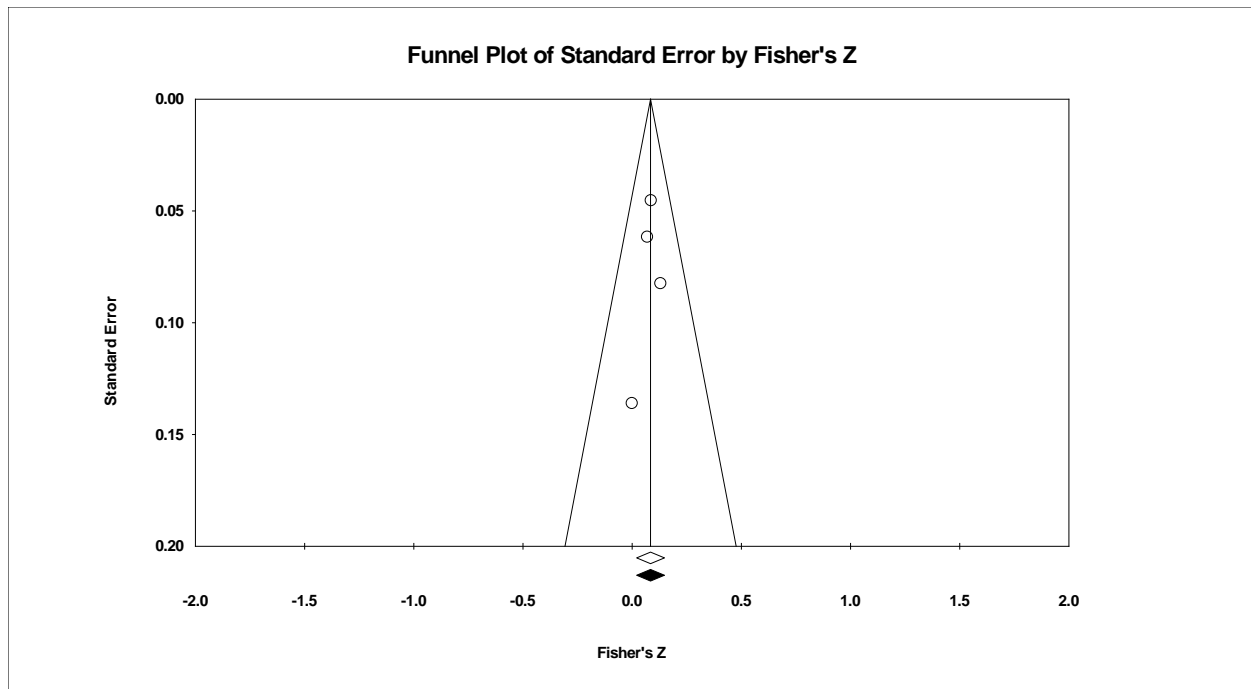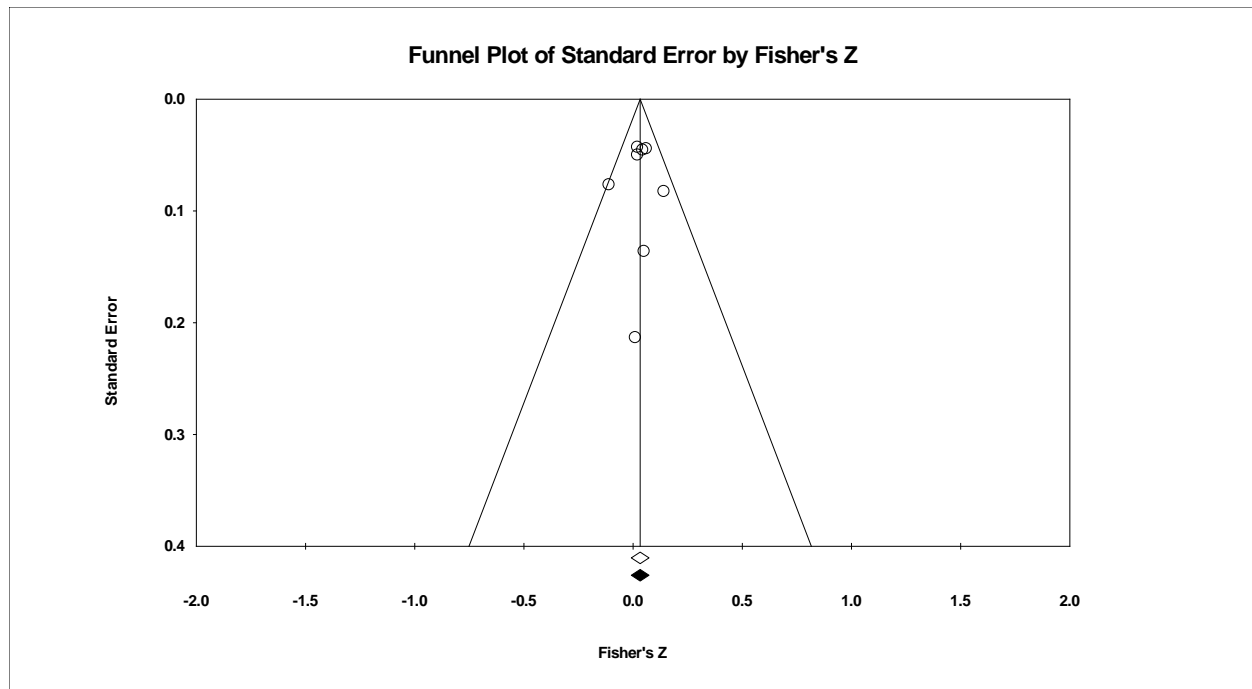
B5. Funnel plot for the relationship between baseline self-oriented perfectionism and follow up anxiety, controlling for baseline anxiety. Open circles correspond to observed point estimates. The open diamond corresponds to the overall observed point estimates. The filled in circles correspond to overall imputed point estimates. The filled in diamond corresponds to the imputed point estimate. The expected direction of missing studies was specified as being to the left of the mean.

Supplemental Material C: Forest Plots

Concern over mistakes

Study name	Statistics for each study					Correlation and 95% CI
	Correlation	Lower limit	Upper limit	Z-Value	p-Value	
Arkam et al. (2015)	0.010	-0.251	0.270	0.073	0.941	
Damian et al. (2016)	0.130	0.042	0.216	2.882	0.004	
Mandel et al. (2015)	0.070	-0.091	0.228	0.850	0.395	
Oddo-Sommerfeld et al. (2016)	0.170	0.051	0.284	2.784	0.005	
Sherry et al. (2014)	0.070	-0.043	0.181	1.212	0.225	

-1.00   -0.50   0.00   0.50   1.00
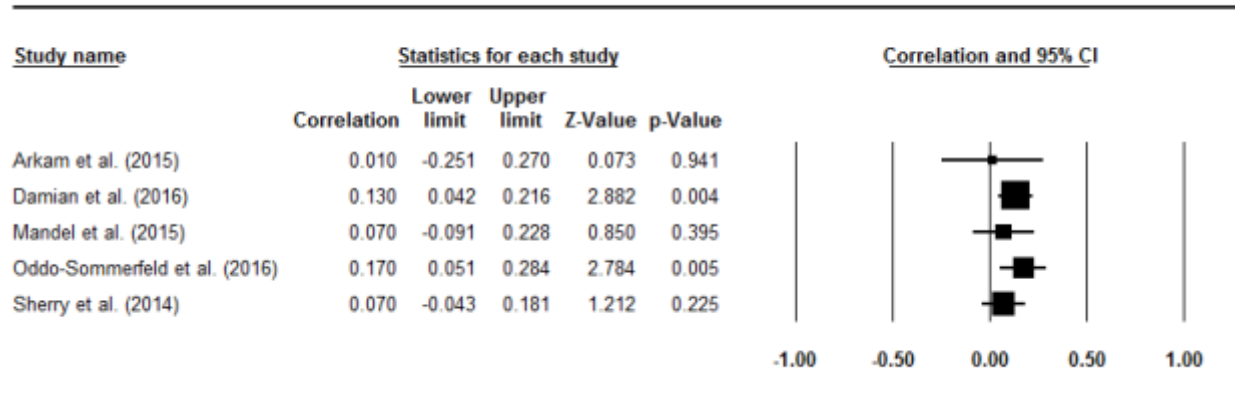
C1. Forest plot of baseline concern over mistakes predicting follow up anxiety (controlling for baseline anxiety). Random effects weights with prediction interval are shown. Boxes represent effect sizes and are proprotional in area to a study's weight.

Doubts about actions

Study name	Statistics for each study					Correlation and 95% CI
	Correlation	Lower limit	Upper limit	Z-Value	p-Value	
Arkam et al. (2015)	0.170	-0.095	0.412	1.261	0.207	
Damian et al. (2016)	0.150	0.062	0.236	3.332	0.001	
Flaxman et al. (2012)	0.250	0.028	0.449	2.197	0.028	
Oddo-Sommerfeld et al. (2016)	0.160	0.041	0.275	2.617	0.009	
Sherry et al. (2014)	0.010	-0.103	0.123	0.173	0.863	

-1.00   -0.50   0.00   0.50   1.00
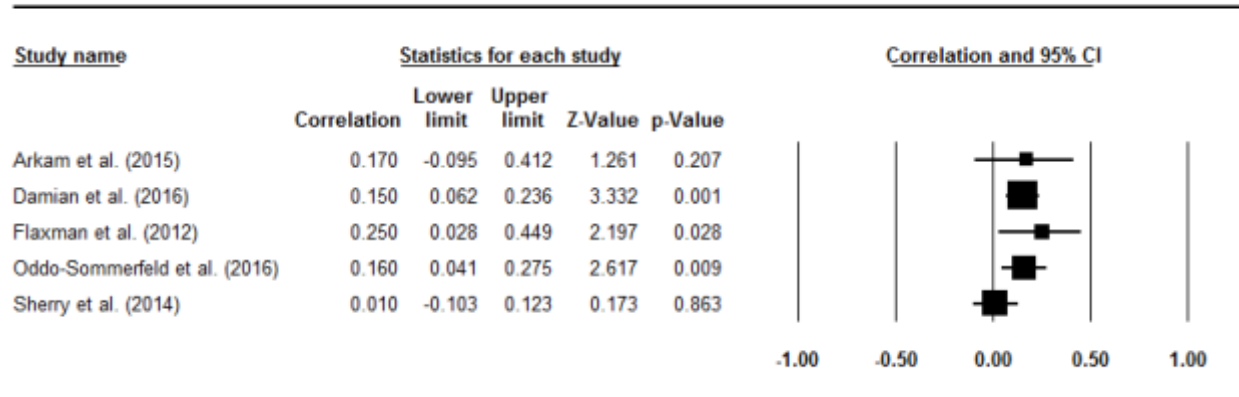
C2. Forest plot of baseline doubts about actions predicting follow up anxiety (controlling for baseline anxiety). Random effects weights with prediction interval are shown. Boxes represent effect sizes and are proprotional in area to a study's weight.

Socially prescribed perfectionism

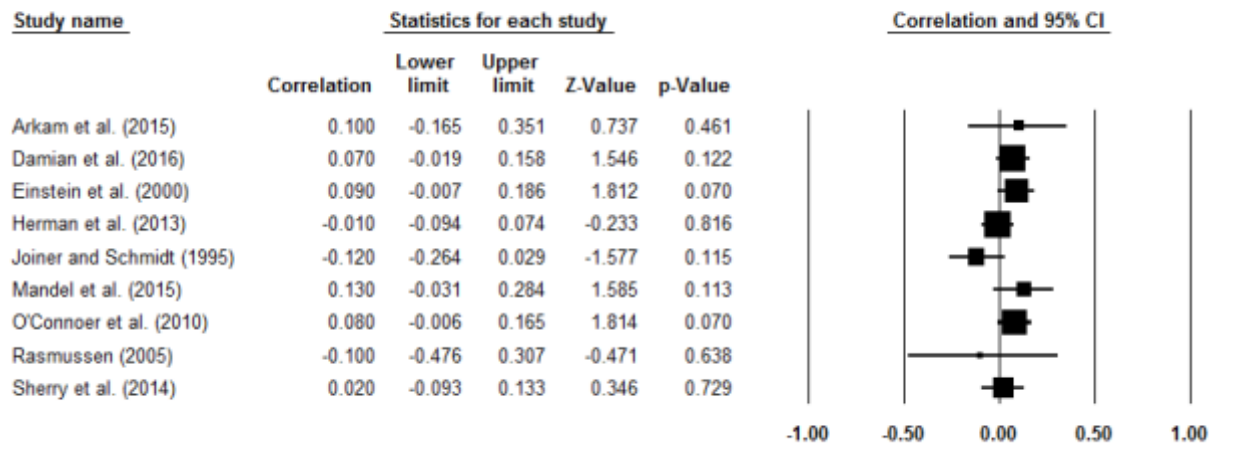| Study name	Statistics for each study					Correlation and 95% CI
	Correlation	Lower limit	Upper limit	Z-Value	p-Value	
Arkam et al. (2015)	0.100	-0.165	0.351	0.737	0.461	
Damian et al. (2016)	0.070	-0.019	0.158	1.546	0.122	
Einstein et al. (2000)	0.090	-0.007	0.186	1.812	0.070	
Herman et al. (2013)	-0.010	-0.094	0.074	-0.233	0.816	
Joiner and Schmidt (1995)	-0.120	-0.264	0.029	-1.577	0.115	
Mandel et al. (2015)	0.130	-0.031	0.284	1.585	0.113	
O'Connoer et al. (2010)	0.080	-0.006	0.165	1.814	0.070	
Rasmussen (2005)	-0.100	-0.476	0.307	-0.471	0.638	
Sherry et al. (2014)	0.020	-0.093	0.133	0.346	0.729	

-1.00   -0.50   0.00   0.50   1.00

C3. Forest plot of baseline socially prescribed perfectionism predicting follow up anxiety (controlling for baseline anxiety). Random effects weights with prediction interval are shown. Boxes represent effect sizes and are proprotional in area to a study's weight.

Personal standards

Study name	Statistics for each study					Correlation and 95% CI
	Correlation	Lower limit	Upper limit	Z-Value	p-Value	
Arkam et al. (2015)	0.000	-0.261	0.261	0.000	1.000	
Damian et al. (2016)	0.090	0.001	0.177	1.989	0.047	
Mandel et al. (2015)	0.130	-0.031	0.284	1.585	0.113	
Oddo-Sommerfeld et al. (2016)	0.070	-0.051	0.189	1.137	0.256	

-1.00   -0.50   0.00   0.50   1.00

C4. Forest plot of baseline personal standards predicting follow up anxiety (controlling for baseline anxiety). Random effects weights with prediction interval are shown. Boxes represent effect sizes and are proprotional in area to a study's weight.
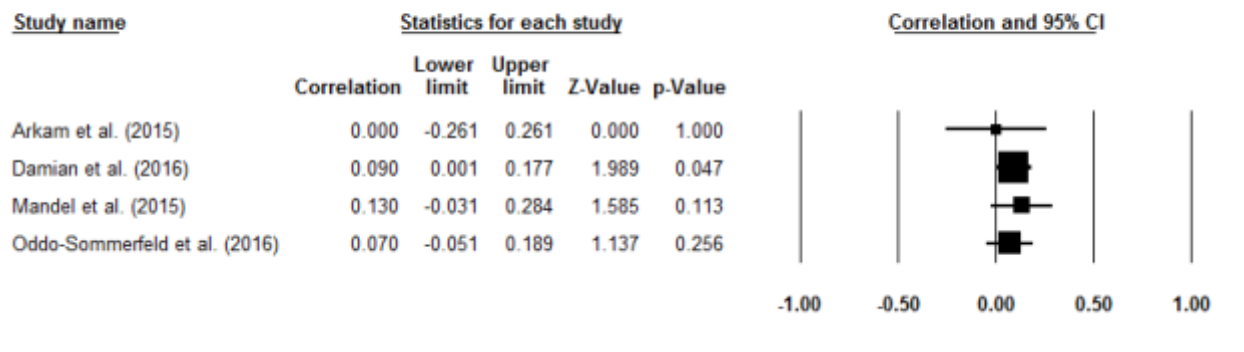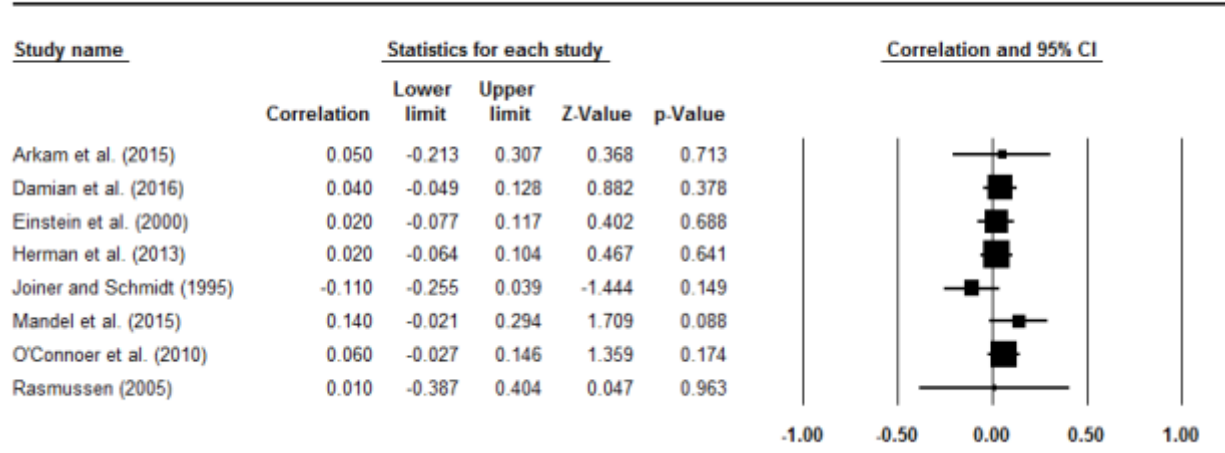
Self-oriented perfectionism

Study name	Statistics for each study					Correlation and 95% CI
	Correlation	Lower limit	Upper limit	Z-Value	p-Value	
Arkam et al. (2015)	0.050	-0.213	0.307	0.368	0.713	
Damian et al. (2016)	0.040	-0.049	0.128	0.882	0.378	
Einstein et al. (2000)	0.020	-0.077	0.117	0.402	0.688	
Herman et al. (2013)	0.020	-0.064	0.104	0.467	0.641	
Joiner and Schmidt (1995)	-0.110	-0.255	0.039	-1.444	0.149	
Mandel et al. (2015)	0.140	-0.021	0.294	1.709	0.088	
O'Connoer et al. (2010)	0.060	-0.027	0.146	1.359	0.174	
Rasmussen (2005)	0.010	-0.387	0.404	0.047	0.963	

-1.00   -0.50   0.00   0.50   1.00

C5. Forest plot of baseline self-oriented perfectionism predicting follow up anxiety (controlling for baseline anxiety). Random effects weights with prediction interval are shown. Boxes represent effect sizes and are proprotional in area to a study's weight.