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Perfectionistic Concerns Predict Increases in Adolescents' Anxiety Symptoms:

A Three-Wave Longitudinal Study

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Abstract

Background and Objectives: Although perfectionism has been proposed to be a risk factor for the development of anxiety, research on perfectionism and anxiety symptoms in adolescents is scarce and inconclusive. The aim of the present study was to investigate whether the two higher-order dimensions of perfectionism—perfectionistic strivings and perfectionistic concerns—predict the development and maintenance of anxiety symptoms. An additional aim of the present study was to examine potential reciprocal effects of anxiety symptoms predicting increases in perfectionism. Design: The study used a longitudinal design with three waves spaced 4-5 months apart. Methods: A non-clinical sample of 489 adolescents aged 12-19 years completed a paper-and-pencil questionnaire. Results: As expected, results showed a positive effect from perfectionistic concerns to anxiety symptoms, but the effect was restricted to middle-to-late adolescents (16-19 years old): Perfectionistic concerns predicted longitudinal increases in adolescents' anxiety symptoms whereas perfectionistic strivings did not. Furthermore, anxiety symptoms did not predict increases in perfectionism. Conclusions: Implications for the understanding of the relationship between perfectionism and anxiety symptoms are discussed.

Keywords: perfectionism; anxiety symptoms; adolescents; longitudinal data

Introduction

Perfectionism is a personality disposition characterized by exceedingly high standards of performance and concerns about making mistakes or about social consequences of not being perfect (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991). The developmental changes that occur in adolescence—such as increases in cognitive abilities, self-consciousness, and awareness of social standards—make it a period of elevated susceptibility to evaluative feedback and to others' achievement expectations (Flett & Hewitt, 2014; Flett, Hewitt, Oliver, & Macdonald, 2002). Thus, adolescence is a key period for the study of perfectionism. Hence, it comes as no surprise that perfectionism in adolescents has been associated with indicators of emotional distress such as negative affect, depressive symptoms, somatic complaints, and suicide ideation (Damian, Stoeber, Negru, & Băban, 2014; Stoeber & Rambow, 2007; Roxborough et al., 2012).

One key indicator of emotional distress in adolescents is anxiety. Moreover, elevated levels of anxiety in adolescents have been shown to predict developmental trajectories leading to psychological maladjustment that can persist into adulthood (Hale, Raaijmakers, Muris, Van

Hoof, & Meeus, 2008). Consequently, it is important to identify risk factors that contribute to the development of anxiety in adolescence. It has been long proposed that perfectionism is a risk factor that contributes to the development and maintenance of a variety of anxiety symptoms (Egan, Wade, & Shafran, 2011). Furthermore, cross-sectional studies with adolescents show that perfectionism and anxiety are positively correlated (e.g., Essau, Leung, Conradt, Cheng, & Wong, 2008; Hewitt et al., 2002; Sironic & Reeve, 2015) which suggests that perfectionism may be a risk factor contributing to the development of anxiety. However, there are only few longitudinal studies with adolescents that have examined whether perfectionism predicts increases in anxiety over time. Moreover, the studies had some methodological limitations, and their findings were inconclusive. Consequently, the present study aimed to address these limitations and reinvestigated the longitudinal relationships of perfectionism and anxiety in adolescents using a three-wave longitudinal design.

Perfectionism and Anxiety in Adolescents

Research on perfectionism has shown that it is best conceptualized as a multidimensional personality disposition (Frost et al., 1990; Hewitt & Flett, 1991). Moreover, it has shown that different dimensions of perfectionism form two higher-order dimensions: perfectionistic strivings and perfectionistic concerns (e.g., Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; Stoeber & Otto, 2006). Perfectionistic strivings capture the dimensions of perfectionism reflecting self-oriented striving for perfection and need to be perfect (self-oriented perfectionism) and perfectionistic personal standards of performance. In contrast, perfectionistic concerns capture the dimensions of perfectionism reflecting beliefs that others expect perfection (socially prescribed perfectionism) and evaluative concerns such as concerns about making mistakes and doubts about actions (Frost et al., 1990; Hewitt & Flett, 1991; see Stoeber & Otto, for a review).

Although the two higher-order dimensions of perfectionism are positively correlated and show substantial overlap, they often show different relationships with psychological maladjustment. As regards anxiety, only perfectionistic concerns have shown consistent and strong positive relationships with anxiety in nonclinical populations and are considered a risk factor for the development and maintenance of anxiety disorders (Lo & Abbott, 2013; Pine, Cohen, Gurley, Brook, & Ma, 1998). In contrast, perfectionistic strivings have shown inconsistent and weaker positive relationships with anxiety making it doubtful that perfectionistic strivings represent a risk factor for the development of anxiety disorders (Lo & Abbott, 2013).

A number of studies has examined the relationships of perfectionism and anxiety in children and adolescents and found that both perfectionistic strivings and perfectionistic concerns were positively related to anxiety (e.g., Essau et al., 2008; Flett, Coulter, Hewitt, & Nepon, 2011; Guignard, Jacquet, & Lubart, 2012). However, most of the studies have been cross-sectional. Hence, it is unclear whether perfectionism predicts increases in anxiety or whether it is only a correlate of anxiety (cf. Affrunti & Woodruff-Borden, in press). Furthermore, a recent longitudinal study with college students found that social anxiety predicted increases in perfectionistic concerns (Gautreau, Sherry, Mushquash, & Stewart, 2015). Consequently, it is possible that the relationships are bidirectional: Perfectionistic concerns may predict increases in anxiety, and anxiety may predict increases in perfectionistic concerns.

Three longitudinal studies have examined perfectionism and anxiety in adolescents using two measurement points (two-wave longitudinal studies). Unfortunately, all three studies have methodological limitations and therefore did not yield conclusive findings. The first study (Einstein, Lovibond, & Gaston, 2000) found positive cross-sectional relationships between perfectionistic concerns and anxiety, but no significant longitudinal relationships as perfectionistic concerns failed to predict increases in anxiety over time. (The effect was only marginally significant, $p < .10$.) However, with eight weeks, the time span between measurements was rather short and may have been too short for perfectionistic concerns to effect significant increases in anxiety (cf. Dormann & Griffin, 2015), and perhaps longer time spans are needed for the effect of perfectionistic concerns on anxiety to unfold. The second study (O'Connor, Rasmussen, & Hawton, 2010) did investigate a longer time span (six months), but—unexpectedly—found that perfectionistic strivings predicted longitudinal increases in anxiety, not perfectionistic concerns. However, perfectionistic strivings were measured with a scale capturing self-critical perfectionism (critical self-oriented perfectionism; O'Connor, Dixon, & Rasmussen, 2009) which has been shown to be more closely related to perfectionistic concerns than to perfectionistic strivings (Dunkley & Blankstein, 2000). Moreover, the study did not measure perfectionism at both time points, and hence did not control for possible bidirectional effects between perfectionism and anxiety which is essential for establishing the direction of effects when analyzing longitudinal panel data (T. Little, Card, Preacher, & McConnell, 2009). The third study (Herman, Wang, Trotter, Reinke, & Ialongo, 2013) investigated a long time span (seven years), but did not use a variable-centered approach examining the longitudinal relationships of perfectionism and anxiety. Instead, the study used a person-centered approach

examining groups of adolescents with different developmental trajectories. The study found that adolescents who, over the seven years, showed stable high levels of perfectionistic concerns or increasing levels of perfectionistic concerns reported increased anxiety at the end of the study compared to adolescents who showed stable low levels of perfectionistic concerns. Whereas this finding suggests that perfectionistic concerns were associated with longitudinal increases in anxiety in adolescents, the longitudinal effects of perfectionistic concerns on anxiety were not tested directly (and neither were potential reciprocal effects). Consequently, the question of whether perfectionistic concerns represent a risk factor for the development of anxiety in adolescents is still unanswered, as are the questions of whether perfectionistic strivings play a role and whether the longitudinal perfectionism–anxiety relationships are reciprocal.

The Present Study

Against this background, the present research represented the first longitudinal study investigating whether the two higher-order dimensions of perfectionism—perfectionistic strivings and perfectionistic concerns—predict the development and maintenance of anxiety in adolescents that measures perfectionism and anxiety across multiple time points. In addition, the study was the first to investigate the longitudinal relationships of perfectionism and anxiety across more than two points of time employing a longitudinal design with three waves spaced four to five months. Furthermore, the study examined a large non-clinical sample of adolescents aged 12-19 years. It has been suggested that research with general populations of adolescents may better identify risk factors for the development of anxiety than research with clinical populations (Pine et al., 1998). As regards perfectionism, the study examined self-oriented perfectionism and personal standards as combined indicators of perfectionistic strivings; and socially prescribed perfectionism, concern over mistakes, and doubts about actions as combined indicators of perfectionistic concerns (Stoeber & Otto, 2006). As regards anxiety, the study examined clinically relevant anxiety symptoms using an anxiety measure combining panic and somatic symptoms, generalized anxiety symptoms, social anxiety and phobia symptoms, separation anxiety symptoms, and school anxiety symptoms (Birmaher, Khetarpal, et al., 1997). In line with theory and research indicating that the perfectionism dimension driving anxiety is perfectionistic concerns, not perfectionistic strivings (Burgess & DiBartolo, 2016), we expected that perfectionistic concerns would predict longitudinal increases in anxiety, but also examined potential effects of perfectionistic strivings (O'Connor et al., 2010) as well as potential reciprocal effects (Gautreau et al., 2015).

Method

Participants and Procedure

A sample of adolescents of Romanian ethnicity attending 6th to 12th grade of two public middle and high schools was recruited for a longitudinal study with three time points over three academic semesters. Data collection for Time 1 took place at the end of the second semester of the academic year, for Time 2 five months later in the first semester of the next academic year, and for Time 3 four months later in the second semester. The total sample comprised 489 adolescents (54% female), of whom 44% were early-to-middle adolescents (age 12-15 years) and 56% were middle-to-late adolescents (age 16-19 years). Mean age of students at Time 1 was 15.9 years (SD = 1.8). At all time points, participants completed the same paper-and-pencil questionnaire in the classroom during school hours. Participants received no compensation for participating in the study. The study was approved by the ethics committee of the Faculty of Psychology and Educational Sciences of the first author's university and by the two schools' principals through a written collaboration protocol. The schools ensured informing the students and their parents about the study and obtaining passive consent from them (i.e., in the case they refused to participate, they had to inform the teachers; in the case they agreed to participate, they completed the questionnaire with a verbal consent). Participation was voluntary: Adolescents could opt out of the study and instead do homework or other school activities. Less than 1% of the students refused to participate. All students who consented to participate were included in the study as no recruitment exclusion criteria were applied.

Measures

To measure perfectionism we used the Child–Adolescent Perfectionism Scale (Flett et al., 2016) capturing self-oriented perfectionism (12 items; e.g., "I try to be perfect in everything I do") and socially prescribed perfectionism (10 items; "Other people think that I have failed if I do not do my very best all the time"). In addition, we used the three subscales from the Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990) capturing personal standards (7 items; e.g., "I have extremely high goals"), concern over mistakes (9 items; "I should be upset if I make a mistake"), and doubts about actions (4 items; "I usually have doubts about the simple everyday things I do"). All scales have demonstrated reliability and validity in numerous studies with adolescents (e.g., Damian et al., 2014; Flett et al., 2016; Hewitt et al., 2002; Soenens et al., 2008). To obtain the two higher-order dimensions of perfectionism we followed Dunkley, Blankstein, Halsall, Williams, and Winkworth (2000) combining (a) self-oriented perfectionism

and personal standards to capture perfectionistic strivings and (b) socially prescribed perfectionism, concern over mistakes, and doubts about actions to capture perfectionistic concerns (see also Enns, Cox, Sareen, & Freeman, 2001; Stoeber & Otto, 2006).

To measure anxiety symptoms in the past three months, we used the self-report version of the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher, Khetarpal, et al.,1997) capturing panic and somatic symptoms (13 items; e.g., "When I get frightened, my heart beats fast"), generalized anxiety symptoms (9 items; "I am a worrier"), social anxiety/phobia symptoms (7 items; "I feel shy with people I don't know well"), separation anxiety symptoms (8 items; "I worry that something bad might happen to my parents"), and school anxiety symptoms (4 items; "I worry about going to school"). The SCARED has been used in numerous studies with clinical and non-clinical samples of adolescents and has demonstrated robust psychometric properties (e.g., Birmaher, Brent, et al., 1999; DeSousa et al., 2014; Hale, Crocetti, Raaijmakers, & Meeus, 2011).

All scales were translated into Romanian following standard back-translation procedures as recommended by Brislin (1986) using two independent translators. A third person then finalized the Romanian version. Participants responded to all items on a scale from 1 (*always false for me*) to 5 (*always true for me*). Scale scores were computed by averaging across items (mean item scores).

The translation of the CAPS was previously used in studies with Romanian adolescents and the two subscales demonstrated validity by showing associations with positive and negative affect in the expected directions (Damian et al., 2014). The translations of the FMPS and SCARED subscales were used for the first time with the present sample.

Data Screening

Of the total sample, 236 adolescents (48%) participated at all time points, 63 (13%) at Time 1 and Time 2, 45 (9%) at Time 1 and Time 3, 39 (8%) at Time 2 and Time 3, 44 (9%) only at Time 1, 31 (6%) only at Time 2, and 31 (6%) only at Time 3. Furthermore, 2% of item responses in the completed questionnaires were missing. Consequently, we compared participants with and without missing data using R. Little's (1988) Missing Completely at Random (MCAR) test. The MCAR test revealed a normed chi-square (χ^2/df) of 0.95 which indicates a good fit between sample scores with and without imputations according to guidelines offered by Bollen (1989). Hence, there was no evidence for attrition-related bias, suggesting that data were likely to be missing at random. Next, we inspected the reliability of the combined scale

scores by computing Cronbach's alphas as well as omega coefficients (ω_t; Revelle & Zinbarg, 2008) using *psych* (Revelle, 2016). As Table 1 shows, all scores showed good to excellent reliability as indicated by alphas $\geq .87$ and omegas $\geq .89$.

      Finally, we tested whether the two dimensions of perfectionism and anxiety symptoms showed measurement invariance across time. For each construct, we compared the metric model in which factor loadings were constrained to be equal across time with the configural (baseline) model. Model comparisons were conducted considering changes in fit indices based on the following three criteria of which at least two had to be met: $\Delta\chi^2$ significant at $p < .05$, ΔCFI $\geq -.010$, and ΔRMSEA $\geq .015$ (Chen, 2007; Cheung & Rensvold, 2002). All change indices were nonsignificant indicating longitudinal measurement invariance for both constructs (perfectionism: $\Delta\chi^2$ [6] = 2.32, $p = .89$, ΔCFI = .001, ΔRMSEA = $-.004$; anxiety symptoms: $\Delta\chi^2$ [8] = 9.11, $p = .33$, ΔCFI = .000, ΔRMSEA = $-.003$).

Results

Bivariate Correlations

      Means, standard deviations, and bivariate correlations presented in Table 1 were estimated in M*plus* 6.12 (Muthén & Muthén, 1998-2010) using full information maximum likelihood (FIML) which is the recommended method for estimating missing data (Graham, 2009). The correlations showed that, within and across all time points, perfectionistic strivings and perfectionistic concerns were positively correlated, and both were positively correlated with anxiety symptoms. Because previous research found age and gender differences in adolescent anxiety (Hale, Raaijmakers, Muris, & Meeus, 2005), we also examined the correlations with age and gender. Age at Time 1 showed positive correlations with perfectionistic strivings at all time points and negative correlations with anxiety symptoms at Time 2 and Time 3, indicating that older adolescents showed higher levels of perfectionistic strivings and lower levels of anxiety symptoms than younger adolescents. Gender (female) showed positive correlations with perfectionistic strivings at Time 3 and with anxiety symptoms at all time points, indicating that girls showed higher levels of perfectionistic strivings and anxiety symptoms than boys.

Cross-Lagged Analyses

      To examine the longitudinal relationships between perfectionism and anxiety symptoms, we conducted cross-lagged analyses in M*plus* using the maximum likelihood robust estimator (MLR; Satorra & Bentler, 1994). We followed a model comparison approach (Kline, 2010) and evaluated the model fit through multiple indices (Byrne, 2012): the Comparative Fit Index (CFI)

and Tucker-Lewis Index (TLI), with values higher than .90 indicative of an acceptable fit and values higher than .95 suggesting an excellent fit; the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR), with values below .08 suggesting acceptable fit and values less than .05 good fit; and the Akaike information criterion (AIC) and Bayesian information criterion (BIC) with lower values indicating better fit.

We tested a model with all cross-lagged effects between perfectionistic strivings, perfectionistic concerns, and anxiety symptoms. In the model, perfectionistic strivings and perfectionistic concerns at Time 1 predicted each other and anxiety symptoms at Time 2, and anxiety symptoms at Time 1 predicted perfectionistic strivings and perfectionistic concerns at Time 2. The exact same effects were estimated from Time 2 to Time 3. In addition, we controlled for first-order autoregressive paths (i.e., stability paths from Time 1 to Time 2 and from Time 2 to Time 3) and second-order autoregressive paths (i.e., stability paths from Time 1 to Time 3) for all variables (Geiser, 2013). Furthermore, we controlled for within-time correlations among all variables. To explore whether the cross-lagged effects were time-invariant (i.e., assumed to be stationary), we compared two models: Model 1 in which cross-lagged paths were constrained to be equal across time (fixed) and Model 2 in which cross-lagged paths were unconstrained (free to vary).

To examine whether Model 1 showed a better fit than Model 2, we compared the models based on the following three criteria of which at least two had to be met: $\Delta\chi^2$ significant at $p <$ .05, ΔCFI $\geq -.010$, and ΔRMSEA $\geq .015$ (Chen, 2007; Cheung & Rensvold, 2002). None of the criteria was met and the models were not significantly different (see Table 2) indicating that both models fitted the data equally well. Hence, we retained Model 1 (the time-invariant model) as the final model because it was the more parsimonious of the two. Figure 1 shows Model 1 with all significant longitudinal paths. (To avoid overloading the figure, the within-time correlations of Model 1 are reported in Table 3.) Although the significant cross-lagged effects are small, they are meaningful when predicting relative changes in longitudinal autoregressive models, because controlling for autoregressive paths and within-time correlations removes a substantial amount of the variance to be predicted in the outcome variables (cf. Adachi & Willoughby, 2015). Results showed a positive unidirectional longitudinal effect from perfectionistic concerns to anxiety symptoms. There were no effects from perfectionistic strivings to anxiety symptoms and no effects from anxiety symptoms to either perfectionistic strivings or perfectionistic concerns. Hence, perfectionistic concerns predicted longitudinal increases in anxiety symptoms whereas

perfectionistic strivings did not. Also, anxiety symptoms did not predict longitudinal increases in perfectionism.

Additional Analyses

Finally, we explored whether the model was invariant across gender and age groups. To this effect, we conducted multi-group analyses examining whether the cross-lagged paths were significantly moderated by gender (0 = male, 1 = female) and age group (0 = 12-15 years, 1 = 16-19 years). Results suggested that the cross-lagged paths were not moderated by gender, as two of the three change indices were nonsignificant indicating that the constrained model in which parameters were fixed across groups was not significantly different from the unconstrained model in which the parameters were free to vary across gender ($\Delta\chi^2$ [15] = 26.73, $p < .05$, ΔCFI = $-.008$, ΔRMSEA = .012). Consequently, the model shown in Figure 1 fitted equally well for boys and girls.

Results, however, suggested that the cross-lagged paths were moderated by age, as two of the three change indices were significant indicating that the constrained model in which parameters were fixed across groups did not fit as well as the unconstrained model in which the parameters were free to vary across age ($\Delta\chi^2$ [15] = 37.81, $p < .01$, ΔCFI = $-.016$, ΔRMSEA = .009). The model shown in Figure 1 fitted only for middle-to-late adolescents (16-19 years). For early-to-middle adolescents (12-15 years), the paths from perfectionistic concerns to anxiety symptoms were nonsignificant, as were all other cross-lagged paths.

Discussion

Although perfectionism has been proposed to be a risk factor for the development of anxiety, cross-sectional and longitudinal research on this relationship in adolescents is scarce and inconclusive. The aim of the present study was to investigate whether the two higher-order dimensions of perfectionism—perfectionistic strivings and perfectionistic concerns—predict the development and maintenance of anxiety symptoms in a large non-clinical sample of adolescents using a longitudinal design with three waves spanning overall nine months. An additional aim of the present study was to examine potential reciprocal effects of anxiety symptoms predicting increases in perfectionism. As expected, results showed a positive effect from perfectionistic concerns to anxiety symptoms: Perfectionistic concerns predicted longitudinal increases in adolescents' anxiety symptoms whereas perfectionistic strivings did not. In addition, anxiety symptoms did not predict increases in perfectionism.

As expected, the study's findings suggest that perfectionistic concerns represent a risk

factor for adolescents' anxiety symptoms. Adolescents who were high in perfectionistic concerns—that is, who perceived that others had perfectionistic expectations of them and who were concerned about making mistakes and uncertain about their actions—tended to experience increased anxiety symptoms over time. That is, they increasingly felt more panic and somatic symptoms, generalized anxiety symptoms, social anxiety symptoms, separation anxiety symptoms, and school anxiety symptoms, as a total. The findings are in line with previous findings in the literature showing that indicators of perfectionistic concerns are positively associated with anxiety in adolescents cross-sectionally (Einstein et al., 2000; Flett, Coulter, & Hewitt, 2012). Moreover and more importantly, the present findings bring empirical support for the long proposed hypothesis that the higher-order dimension of perfectionistic concerns represents a risk factor contributing to the development and maintenance of anxiety symptoms in adolescence (cf. Egan et al., 2011). Interestingly, this effect was restricted to middle-to-late adolescents (16-19 years) whereas it was nonsignificant for early-to-middle adolescents (12-15 years). One possible explanation is the fact that cognitive abilities, self-consciousness, awareness of social standards, and susceptibility to evaluative feedback and to others' achievement expectations increase in adolescence (cf. Flett et al., 2002). In addition, it has been shown that older adolescents report higher levels of anxiety symptoms than younger adolescents (Birmaher et al., 1997; Hale et al., 2005). Hence, it is possible that, for these reasons, perfectionistic concerns represent a risk factor for the development and maintenance of anxiety symptoms mainly for older adolescents.

In contrast, perfectionistic strivings did not exert longitudinal effects on anxiety symptoms, which is in line with previous findings (Einstein et al., 2000). That is, having perfectionistic expectations of oneself and setting exceedingly high personal standards of performance do not seem to represent a risk factor for developing or maintaining anxiety symptoms in adolescents. However, perfectionistic strivings showed positive within-time relationships with anxiety symptoms, which was unexpected. Adolescents who had perfectionistic expectations of themselves and set exceedingly high personal standards of performance tended to feel more anxious than adolescents low in perfectionistic strivings. Although unexpected, this finding dovetails with previous findings showing that indicators of perfectionistic strivings can be associated with anxiety symptoms in adolescents (e.g., Essau et al., 2008; Hewitt et al., 2002). Still, our findings suggest that perfectionistic strivings are not a risk factor for developing or maintaining anxiety symptoms in adolescents, but only a correlate

of anxiety symptoms. Another possibility is that the inconsistent pattern of relationships between perfectionistic strivings and anxiety symptoms may be due to the fact that they are positively associated only under certain circumstances such as stressful situations (e.g., Dunkley et al., 2000). Hence, future studies should test possible moderators of this relationship to find under which circumstances perfectionistic strivings are positively, negatively, or not associated with anxiety (cf. Burgess & DiBartolo, 2016).

Furthermore, our findings suggest that anxiety symptoms do not predict longitudinal increases in perfectionism in adolescents over nine months, which stands in contrast to Gautreau et al.'s (2015) finding that social anxiety predicted longitudinal increases in perfectionistic concerns in college students over 12 months. Hence, it is possible that the relationship between perfectionism and anxiety symptoms is reciprocal, but the effects may unfold over different time spans or at different developmental periods. Future studies should shed more light on this relationship longitudinally.

Limitations and Future Research

The present study has a number of limitations. First, the study focused on a non-clinical sample of adolescents with relatively low levels of anxiety symptoms. Future studies should further investigate the role of perfectionism in the development of anxiety disorders in clinical samples. Second, the study relied on adolescents' self-reports regarding their anxiety symptoms, which may not represent an accurate account of their actual anxiety. Even though self-reports provide invaluable information (Baldwin, 2000), future studies may profit from additionally including observational data and parent or teacher reports to get a more comprehensive account of adolescents' anxiety. Third, the present study may be limited to the particular time spans investigated (five months from Time 1 to Time 2 and four months from Time 2 to Time 3). Hence, future studies may want to investigate whether the present findings generalize to other (e.g., longer) time spans. Finally, the study examined Romanian adolescents and used translations of self-report measures that had not been used previously. Future studies should reexamine the present findings in English speaking samples using the original measures.

Conclusions

The present study has important implications for our understanding of the role perfectionism plays in the development and maintenance of adolescents' anxiety symptoms. It is the first to longitudinally investigate the two higher-order dimensions of perfectionism in relation to anxiety symptoms in adolescents and to show a robust longitudinal effect of perfectionistic

concerns on adolescents' anxiety symptoms. The present findings indicate that perfectionism represents a risk factor for the development of anxiety symptoms, suggesting that significant changes in anxiety symptoms can be predicted by perfectionism over a period of only four to five months.

References

Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *The European Journal of Developmental Psychology*, *12*, 116-128. doi: 10.1080/17405629.2014.963549

Affrunti, N. W., & Woodruff-Borden, J. (in press). Perfectionism and anxiety in children. In J. Stoeber (Ed.), *The psychology of perfectionism: Theory, research, applications*. London: Routledge.

Baldwin, W. (2000). Information no one else knows: The value of self-report. In A. A. Stone, J. S. Turkkan, C. A. Bachrach, J. B. Jobe, H. S. Kurtzman & V. S. Cain (Eds.), *The science of self-report: Implications for research and practice* (pp. 3-7). Mahwah, NJ: Erlbaum.

Birmaher, B., Brent, D. A., Chiappetta, L., Bridge, J., Monga, S., & Baugher, M. (1999). Psychometric properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED): A replication study. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*, 1230-1236. doi: 10.1097/00004583-199910000-00011

Birmaher, B., Khetarpal, S., Brent, D., Cully, M., Balach, L., Kaufman, J., & Neer, S. M. (1997). The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale construction and psychometric characteristics. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*, 545-553. doi: 10.1097/00004583-199704000-00018

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Brislin, R. W. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural research* (pp. 137-164). Thousand Oaks, CA: Sage.

Burgess, A., & DiBartolo, P. M. (2016). Anxiety and perfectionism: Relationships, mechanisms, and conditions. In F. M. Sirois & D. S. Molnar (Eds.), *Perfectionism, health, and well-being* (pp. 177-203). New York: Springer.

Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming* (2nd ed.). New York: Routledge.

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*, 464-504. doi: 10.1080/10705510701301834

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255. doi: 10.1207/S15328007SEM0902_5

Damian, L. E., Stoeber, J., Negru, O., & Băban, A. (2014). Positive and negative affect in adolescents: An investigation of the 2×2 model of perfectionism. *Cognition, Brain, Behavior, 18,* 1-16.

DeSousa, D. A., Zibetti, M. R., Trentini, C. M., Koller, S. H., Manfro, G. G., & Salum, G. A. (2014). Screen for child anxiety related emotional disorders: Are subscale scores reliable? A bifactor model analysis. *Journal of Anxiety Disorders, 28*, 966-970. doi: 10.1016/j.janxdis.2014.10.002

Dormann, C., & Griffin, M. A. (2015). Optimal time lags in panel studies. *Psychological Methods, 20*, 489-505. doi: 10.1037/met0000041

Dunkley, D. M., & Blankstein, K. R. (2000). Self-critical perfectionism, coping, hassles, and current distress: A structural equation modeling approach. *Cognitive Therapy and Research, 24*, 713-730. doi: 10.1023/A:1005543529245

Dunkley, D. M., Blankstein, K. R., Halsall, J., Williams, M., & Winkworth, G. (2000). The relation between perfectionism and distress: Hassles, coping, and perceived social support as mediators and moderators. *Journal of Counseling Psychology, 47*, 437‑453. doi: 10.1037/0022-0167.47.4.437

Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review, 31*, 203-212. doi: 10.1016/j.cpr.2010.04.009

Einstein, D. A., Lovibond, P. F., & Gaston, J. E. (2000). Relationship between perfectionism and emotional symptoms in an adolescent sample. *Australian Journal of Psychology, 52*, 89-93. doi: 10.1080/00049530008255373

Enns, M. W., Cox, B. J., Sareen, J., & Freeman, P. (2001). Adaptive and maladaptive perfectionism in medical students: A longitudinal investigation. *Medical Education, 35*, 1034‑1042. doi: 10.1111/j.1365-2923.2001.01044.x

Essau, C. A., Leung, P. W. L., Conradt, J., Cheng, H., & Wong, T. (2008). Anxiety symptoms in Chinese and German adolescents: Their relationship with early learning experiences, perfectionism, and learning motivation. *Depression and Anxiety, 25*, 801‑810. doi:

10.1002/da.20334

Flett, G. L., Coulter, L.-M., & Hewitt, P. L. (2012). The Perfectionistic Self-Presentation Scale–
Junior Form: Psychometric properties and association with social anxiety in early
adolescents. *Canadian Journal of School Psychology, 27*, 136-149. doi:
10.1177/0829573511431406

Flett, G. L., Coulter, L., Hewitt, P. L., & Nepon, T. (2011). Perfectionism, rumination, worry,
and depressive symptoms in early adolescents. *Canadian Journal of School Psychology, 26*,
159-176. doi: 10.1177/0829573511422039

Flett, G. L., & Hewitt, P. L. (2014). A proposed framework for preventing perfectionism and
promoting resilience and mental health among vulnerable children and adolescents.
Psychology in the Schools, 51, 899-912. doi: 10.1002/pits.21792

Flett, G. L., Hewitt, P. L., Besser, A., Su, C., Vaillancourt, T., Boucher, D., . . . Gale, O. (2016).
The Child–Adolescent Perfectionism Scale: Development, psychometric properties, and
associations with stress, distress, and psychiatric symptoms. *Journal of Psychoeducational
Assessment, 34*, 634-652. doi: 10.1177/0734282916651381

Flett, G. L., Hewitt, P. L., Oliver, J. M., & Macdonald, S. (2002). Perfectionism in children and
their parents: A developmental analysis. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism:
Theory, research, and treatment* (pp. 89-132). Washington, DC: American Psychological
Association.

Frost, R. O., Heimberg, R. G., Holt, C. S., Mattia, J. I., & Neubauer, A. L. (1993). A comparison
of two measures of perfectionism. *Personality and Individual Differences, 14*, 119-126. doi:
10.1016/0191-8869(93)90181-2

Frost, R. O., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism.
Cognitive Therapy and Research, 14, 449-468. doi: 10.1007/BF01172967

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. doi:
10.1016/j.paid.2015.03.005

Geiser, C. (2013). *Data analysis with Mplus*. New York: Guilford.

Guignard, J.-H., Jacquet, A.-Y., & Lubart, T. I. (2012). Perfectionism and anxiety: A paradox in
intellectual giftedness? *PLOS ONE, 7*, e41043. doi: 10.1371/journal.pone.0041043

Graham, J. W. (2009). Missing data analysis: Making it work in the real world. *Annual Review of*

Psychology, 60, 549‑576. doi: 10.1146/annurev.psych.58.110405.085530

Hale, W. W., III, Crocetti, E., Raaijmakers, Q. A., & Meeus, W. H. J. (2011). A meta-analysis of the cross-cultural psychometric properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED). *Journal of Child Psychology and Psychiatry, 52*, 80-90. doi: 10.1111/j.1469-7610.2010.02285.x

Hale, W. W., III, Raaijmakers, Q. A. W., Muris, P., & Meeus, W. H. J. (2005). Psychometric properties of the screen for child anxiety related emotional disorders (SCARED) in the general adolescent population. *Journal of the American Academy of Child and Adolescent Psychiatry, 44*, 283-290. doi: 10.1097/00004583-200503000-00013

Hale, W. W, III, Raaijmakers, Q. A., Muris, P., Van Hoof, A., & Meeus, W. H. J. (2008). Developmental trajectories of adolescent anxiety disorder symptoms: A 5-year prospective community study. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*, 556-564. doi: 10.1097/CHI.0b013e3181676583

Herman, K. C., Wang, K., Trotter, R., Reinke, W. M., & Ialongo, N. (2013). Developmental trajectories of maladaptive perfectionism among African American adolescents. *Child Development, 84*, 1633-1650. doi: 10.1111/cdev.12078

Hewitt, P. L., Caelian, C. F., Flett, G. L., Sherry, S. B., Collins, L., & Flynn, C. A. (2002). Perfectionism in children: Associations with depression, anxiety, and anger. *Personality and Individual Differences, 32*, 1049‑1061. doi: 10.1016/S0191-8869(01)00109-X

Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*, 456‑470. doi: 10.1037/0022-3514.60.3.456

Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford.

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*, 1198-1202. doi: 10.1080/01621459.1988.10478722

Little, T. D., Card, N. A., Preacher, K. J., & McConnell, E. (2009). Modeling longitudinal data from research on adolescence. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., pp. 15-54). Hoboken, NJ: Wiley.

Lo, A., & Abbott, M. J. (2013). Review of the theoretical, empirical, and clinical status of adaptive and maladaptive perfectionism. *Behaviour Change, 30*, 96-116. doi:

10.1017/bec.2013.9

Muthén, L. K., & Muthén, B. O. (1998-2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

O'Connor, R. C., Dixon, D., & Rasmussen, S. (2009). The structure and temporal stability of the Child and Adolescent Perfectionism Scale. *Psychological Assessment, 21*, 437-443. doi: 10.1037/a0016264

O'Connor, R. C., Rasmussen, S., & Hawton, K. (2010). Predicting depression, anxiety and self-harm in adolescents: The role of perfectionism and stress. *Behaviour Research and Therapy, 48*, 52-59. doi: 10.1016/j.brat.2009.09.008

Pine, D. S., Cohen, P., Gurley, D., Brook, J., & Ma, Y. (1998). The risk for early-adulthood anxiety and depressive disorders in adolescents with anxiety and depressive disorders. *Archives of General Psychiatry, 55*, 56-64. doi: 10.1001/archpsyc.55.1.56

Revelle, W. (2016). *psych: Procedures for psychological, psychometric, and personality research.* Northwestern University, Evanston, IL.

Revelle, W., & Zinbarg, R. E. (2008). Coefficients alpha, beta, omega, and the glb: Comments on Sijtsma. *Psychometrika, 74*, 145-154. doi: 10.1007/s11336-008-9102-z

Roxborough, H. M., Hewitt, P. L., Kaldas, J., Flett, G. L., Caelian, C. M., Sherry, S., & Sherry, D. L. (2012). Perfectionistic self-presentation, socially prescribed perfectionism, and suicide in youth: A test of the perfectionism social disconnection model. *Suicide and Life-Threatening Behavior, 42,* 217-233. doi: 10.1111/j.1943-278X.2012.00084.x

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variable analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA: Sage.

Sironic, A., & Reeve, R. A. (2015). A combined analysis of the Frost Multidimensional Perfectionism Scale (FMPS), Child and Adolescent Perfectionism Scale (CAPS), and Almost Perfect Scale–Revised (APS-R): Different perfectionist profiles in adolescent high school students. *Psychological Assessment, 27*, 1471-1483. doi: 10.1037/pas0000137

Soenens, B., Luyckx, K., Vansteenkiste, M., Luyten, P., Duriez, B., & Goossens, L. (2008). Maladaptive perfectionism as an intervening variable between psychological control and adolescent depressive symptoms: A three-wave longitudinal study. *Journal of Family Psychology, 22*, 465-474. doi: 10.1037/0893-3200.22.3.465

Stoeber, J., & Otto, K. (2006). Positive conceptions of perfectionism: Approaches, evidence, challenges. *Personality and Social Psychology Review, 10,* 295‑319. doi: 10.1207/s15327957pspr1004_2

Stoeber, J., & Rambow, A. (2007). Perfectionism in adolescent school students: Relations with motivation, achievement, and wellbeing. *Personality and Individual Differences, 42*, 1379-1389. doi: 10.1016/j.paid.2006.10.015

Table 1

Descriptive Statistics and Bivariate Correlations

Variable	1	2	3	4	5	6	7	8	9	10
Time 1										
1. Perfectionistic strivings										
2. Perfectionistic concerns	.64***									
3. Anxiety symptoms	.29***	.52***								
Time 2										
4. Perfectionistic strivings	.74***	.46***	.24***							
5. Perfectionistic concerns	.43***	.67***	.42***	.58***						
6. Anxiety symptoms	.25***	.47***	.75***	.28***	.56***					
Time 3										
7. Perfectionistic strivings	.68***	.41***	.25***	.73***	.46***	.24***				
8. Perfectionistic concerns	.40***	.59***	.30***	.48***	.70***	.40***	.64***			
9. Anxiety symptoms	.22***	.42***	.62***	.22***	.45***	.75***	.32***	.49***		
Control variables										
10. Age	.16***	−.01	−.09*	.16***	−.03	−.12**	.10*	.02	−.07	
11. Gender (female)	.03	.03	.30***	.02	.00	.22***	.11*	−.03	.30***	−.10*
M	3.00	2.35	1.93	3.01	2.34	1.92	2.95	2.31	1.91	15.87
SD	0.69	0.64	0.57	0.68	0.65	0.54	0.69	0.68	0.58	1.77
Cronbach's alpha	.88	.89	.93	.87	.90	.92	.89	.92	.94	n/a
Omega coefficient (ω_t)	.90	.91	.94	.89	.92	.94	.91	.94	.95	n/a

Note. $N = 489$. All scores are mean item scores (see data screening section for details). Age = age at Time 1. Gender (female) was coded 0 = male, 1 = female. n/a = not applicable. The omega coefficient (ω_t) represents an improved reliability estimate addressing limitations of Cronbach's alpha (see Revelle & Zinbarg, 2008, for details).

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

Table 2

Cross-Lagged Model Fit Indices and Model Comparison

Model	χ^2	SF	*df*	CFI	TLI	RMSEA	SRMR	AIC	BIC	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA
				Model fit indices						Model comparisons			
Model 1	22.83*	1.02	12	.992	.979	.043	.018	4284.38	4460.20	8.20	6	−.002	−.009
Model 2	14.00*	1.13	6	.994	.969	.052	.011	4288.87	4489.81				

Note. $N = 489$. Model 1 = bidirectional effects constrained to be equal across time; Model 2 = bidirectional effects unconstrained to be equal across time (free to vary) (see Results, Cross-Lagged Analyses for details). SF = Satorra-Bentler χ^2 scaling correction factor; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR= Standardized Root Mean Square Residual; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. Model comparison = comparison between Model 1 and Model 2.
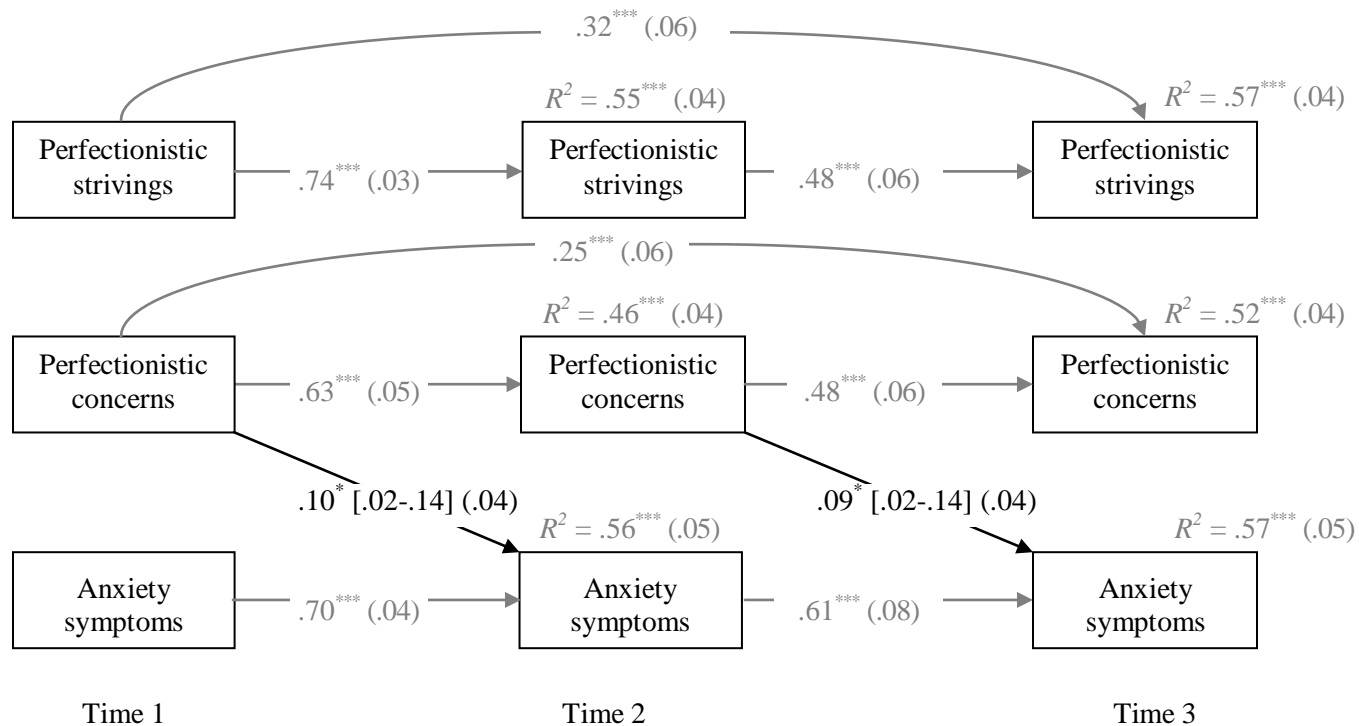
*$p < .05$.

Table 3

Model 1: Within-Time Correlations

Variable	Time 1			Time 2			Time 3		
	1	2	3	1	2	3	1	2	3
1. Perfectionistic strivings									
2. Perfectionistic concerns	.64***			.52***			.59***		
3. Anxiety symptoms	.29***	.52***		.18**	.41***		.28***	.35***	

Note. See Figure 1 for longitudinal relationships.

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

Figure 1. Model 1. Cross-lagged model between perfectionism dimensions and anxiety symptoms. To reduce model complexity, only longitudinal relationships that are significant ($p < .05$) are shown. All coefficients are standardized coefficients. 95% confidence intervals are presented in square brackets for the significant cross-lagged effects and standard errors are presented in parentheses for all significant effects. All within-time correlations were controlled for (see Table 3). The model was gender invariant, but fitted only for middle-to-late adolescents (16-19 years; see Additional Analyses for details).

$^{*}p < .05$, $^{***}p < .001$.