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On the Longitudinal Interplay between Perfectionism and General Affect in Adolescents

Lavinia E. Damian[a]

Oana Negru-Subtirica[a]

Joachim Stoeber[b]

Diana Vois[a]

Author Note

[a]Self and Identity Development Laboratory, Department of Psychology, Babeş-Bolyai University, Republicii 37, 400015, Cluj-Napoca, Romania; [b]School of Psychology, University of Kent, Keynes College, Canterbury, Kent CT2 7NP, United Kingdom

Correspondence concerning this article should be addressed to Lavinia E. Damian, Self and Identity Development Laboratory, Department of Psychology, Babeş-Bolyai University, Republicii 37, 400015, Cluj-Napoca, Romania; e-mail: laviniadamian@psychology.ro.

Abstract

Cross-sectional studies on perfectionism and general affect tend to interpret their findings suggesting affect is an outcome of perfectionism. However, personality theories posit that individual differences in general affect may also influence perfectionism. Expecting to find bidirectional relations, this 3-wave study sought to examine the longitudinal interplay between perfectionism and general affect in a sample of 489 adolescents (54% female) aged 12-19 years. Cross-lagged panel analyses showed a positive unidirectional effect from positive affect to perfectionistic standards as well as a positive bidirectional effect between perfectionistic concerns and negative affect. As expected, general affect was both an antecedent and an outcome of perfectionism. Implications of the findings for the development and outcomes of perfectionism are discussed.

Keywords: perfectionism; general affect; adolescents; longitudinal analyses; gender; age

1. Introduction

Perfectionism in adolescents is important because of the core role it plays in mental health. In particular, adolescent perfectionism has been associated with indicators of psychological maladjustment such as depressive and anxious symptoms (Hewitt et al., 2002), somatic complaints (Stoeber & Rambow, 2007), and suicide ideation (Roxborough et al., 2012). Moreover, perfectionistic concerns have been shown to be a longitudinal predictor of anxiety symptoms in middle-to-late adolescents over a period of four to five months (Damian, Negru-Subtirica et al., 2017) and of depressive symptoms over a period of six months (Levine et al., 2019). This shows that perfectionistic concerns are not only associated with adolescents' affect, but may also be a risk factor for the development of affective symptoms. Consequently, we think it is important to study these processes developing over time. Despite this, there is not yet any longitudinal research investigating perfectionism and general affect in non-clinical samples of adolescents (aside from longitudinal studies on perfectionism and anxiety and depressive symptoms, which are linked with general affect, but not the same construct; Damian, Negru-Subtirica et al., 2017; Levine et al., 2019). Against this background, the present study aims to present the first investigation of the bidirectional longitudinal relations between perfectionism and general affect in adolescents. The study examined a large sample of adolescents and employed a longitudinal design with three time points spaced four to five months apart.

Perfectionism is a prevalent personality disposition that pervades numerous domains of life (Stoeber & Stoeber, 2009), and recent research suggests that its prevalence has been increasing (Curran & Hill, 2019). Perfectionism is characterized by exceedingly high standards of performance and concerns about making mistakes (Stoeber, 2018). According to one of the most widely researched and influential models of perfectionism (Frost et al., 1990), six aspects

of perfectionism need to be differentiated: personal standards, concern over mistakes, doubts about actions, parental expectations, parental criticism, and organization. Recent theory and research, however, suggest that parental expectations and criticism are better conceptualized as developmental antecedents rather than core aspects of perfectionism (Damian et al., 2013; Rice et al., 2005). Moreover, organization is now considered a dimension separate from perfectionistic standards and concerns (Kim et al., 2015; Rice et al., 2005). Consequently, only three aspects of Frost et al.'s model were examined in the present study: personal standards, concern over mistakes, and doubts about action of which the latter two have shown to combine to one factor (Stöber, 1998). Following the two-factor model of perfectionism (Stoeber & Otto, 2006; Stoeber, 2018), personal standards represented the factor capturing personal standards perfectionism and were labeled "perfectionistic standards" in the present study whereas concern over mistakes were combined with doubts about actions to represent the factor capturing evaluative concerns perfectionism and were labelled "perfectionistic concerns" (Stoeber, 2018).

Adolescence is an important period for the study of both perfectionism and affect. 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 et al., 2002). Moreover, longitudinal studies with adolescents have shown that perfectionism manifests important developmental changes in this age group (e.g., Damian et al., 2020; Herman et al., 2013). Additionally, adolescence is marked by rapid developmental changes that elicit high emotional arousal leading to adolescents' experiencing more frequent and more intense emotions (Steinberg, 2008). Hence, it comes as no surprise that adolescents' perfectionism and affective symptoms have been found to be so closely linked (Damian, Negru-Subtirica et al., 2017; Hewitt

et al., 2002; Levine et al., 2019) as has adolescents' perfectionism and emotion regulation (Vois & Damian, 2020).

1.1 General Affect as an Antecedent of Perfectionism. Theoretical Underpinnings and Empirical Evidence

Complication and scar models posit that affective symptoms represent antecedents of personality and thus contribute to longitudinal changes in personality (Bagby et al., 2008). In particular, they propose that intense negative affect may lead to both short-time changes in personality (complication effect) and more permanent changes in personality that may remain after the intense negative affect alleviates (scar effect). For the present study, we focused on the complication model because the study's shorter time-frame did not allow for testing long-term changes in perfectionism based on longitudinal research indicating that social anxiety (Gautreau et al., 2015) and depressive symptoms (Cox & Enns, 2003; Zuroff et al., 1999) predicted increases in perfectionistic concerns.

Affect also plays a role in predicting perfectionism if we consider perfectionism from a developmental perspective. In particular, Flett et al. (2002)—examining how perfectionism develops in children and adolescents—proposed an integrative theoretical model which entails multiple factors pertaining to both external and internal sources contributing to the development of perfectionism. In this model, internal sources (like individual differences in temperament, achievement needs, attachment styles, and academic achievement) play a role in the development of perfectionism in children and adolescents beyond external sources (like parents, school, and society). However, longitudinal research so far has identified only few individual differences representing internal sources predicting perfectionism over time. One longitudinal study with adolescents found that individual differences in conscientiousness play a role with higher levels

of conscientiousness predicting relative increases in perfectionistic standards (Stoeber et al., 2009). Another longitudinal study with adolescents showed that individual differences in academic achievement and academic efficacy to be precursors for perfectionism with higher levels of academic achievement predicting relative increases in both perfectionistic standards and perfectionistic concerns whereas higher academic efficacy predicted increases only in perfectionistic standards (Damian et al., 2017a). Furthermore, a four-wave longitudinal study with adolescents showed that individual differences in exploration in-depth and in ruminative exploration predicted increases in perfectionistic concerns (Negru-Subtirica et al., 2021). Finally, a one-year longitudinal study with adolescents showed that individual differences in school satisfaction predicted relative increases in perfectionistic standards and relative decreases in perfectionistic concerns (Stricker et al., 2019).

Regarding individual differences, so far only cross-sectional research has been conducted examining perfectionism and general negative affect. One study with children showed that perfectionistic concerns mediated the relation between general negative affect and internalizing symptoms in children suggesting that perfectionism was an outcome of negative affect (Affrunti & Woodruff-Borden, 2015). Additionally, fearful temperament altogether with inflexibility in cognitive function predicted perfectionistic concerns in a sample of children cross-sectionally (Affrunti et al., 2016). Consequently, it may be that general affect constitutes both an antecedent and an outcome of perfectionism, but no longitudinal research has yet put this hypothesis to the test.

1.2 General Affect as an Outcome of Perfectionism. Theoretical Underpinnings and Empirical Evidence

In contrast to complication and scar models, the vulnerability model posits that affective

symptoms represent consequences of personality characteristics. Following this model, perfectionism places people at risk of increases in affective symptoms over time (Bagby et al., 2008). The vulnerability model has been widely studied in the perfectionism literature (Hewitt & Flett, 2002) and has received considerable support particularly from findings showing that perfectionistic concerns predicted increases in depressive symptoms over time (e.g., Cox et al., 2009; Dunkley et al., 2009; Hewitt et al., 1996).

Depressive symptoms are intimately linked with general negative affect (Watson et al., 1988), and there is a plethora of cross-sectional research linking perfectionism with general affect in emerging adults (university students) and in adults (e.g., Castro et al., 2017; Frost et al., 1993; Gaudreau & Thompson, 2010) as well as several longitudinal (e.g., Milyavskaya et al., 2014; Moore et al., 2018) and diary studies investigating daily affect (e.g., Dunkley et al., 2014; Dunkley, Ma et al., 2014; Dunkley et al., 2003). In comparison, far less research has been conducted with children and adolescents. One longitudinal study with university students showed that perfectionistic standards were related with more positive affect and only weakly related with negative affect across time. In contrast, perfectionistic concerns were related with less positive and more negative affect across time (Milyavskaya et al., 2014). Another longitudinal study with university students showed that perfectionistic standards were not related with affect over time, but perfectionistic concerns predicted less positive and more negative affect over a period of five months (Moore et al., 2018). And a prospective daily diary studies with non-clinical samples of adults showed that both perfectionistic standards and concerns were connected with increases in daily negative affect and decreases in positive affect over time (Dunkley et al., 2014; Dunkley, Ma, et al., 2014). Furthermore, a diary study with university students showed that students with high levels of perfectionistic concerns experienced greater increases in daily negative affect

(Dunkley et al., 2003). However, none of these studies investigated the influence of affect on perfectionism.

Cross-sectional research with adolescents has shown that perfectionistic standards and concerns differ in their relations with general affect. One study, for example, found perfectionistic standards in adolescents were associated with more positive affect and less negative affect, whereas perfectionistic concerns were associated with less positive affect and more negative affect (Damian et al., 2014). Other cross-sectional studies with children and adolescents, however, showed nonsignificant correlations with positive affect, but only positive relations with negative affect for both perfectionism dimensions (e.g., Stornelli et al., 2009), or only positive relations between perfectionistic concerns and negative affect (e.g., Harvey et al., 2017). Furthermore, a study with adolescent dancers—differentiating four clusters of dancers showing high versus low perfectionistic standards combined with high versus low perfectionistic concerns (cf. Gaudreau & Thompson, 2010)—found that perfectionistic standards were positively correlated with positive affect whereas perfectionistic concerns were negatively correlated with positive affect and positively correlated with negative affect. Also, adolescent dancers with high perfectionistic standards (and low in perfectionistic concerns) reported significantly lower negative affect whereas those with high perfectionistic concerns (and low in perfectionistic standards) reported significantly lower positive affect (Cumming & Duda, 2012).

1.3 The Present Study: Reciprocal Relations between General Affect and Perfectionism

From a theoretical perspective, complication/scar and vulnerability models have initially been presented as competing models (e.g., Bagby et al., 2008). However, there is also theory and research proposing an integrative model suggesting that the complication/scar and vulnerability models complement each other and positing reciprocal effects (e.g., Zuroff et al., 1999). As

regards perfectionism and affect, a reciprocal model would posit that personality and affective symptoms show bidirectional relations and that perfectionism and general affect may reinforce each other over time: General affect predicts change in perfectionism and perfectionism predicts change in general affect. The reciprocal relations model has received some support with studies showing that perfectionistic concerns and depressive symptoms show bidirectional relations over time (McGrath et al., 2012; Vaillancourt & Haltigan, 2018). As depressive symptoms and negative affect are intimately linked, the present study expanded on this research and adopted an integrative reciprocal model. Namely, it explored the bidirectional relations between perfectionism and general affect over time in a large sample of adolescents.

In particular, the present study expanded on previous research and findings (as referenced in the previous sections) in three important ways. First, even though all previous research studies with children and adolescents were cross-sectional, results were interpreted such that general affect was an outcome of perfectionism (e.g., Harvey et al., 2017; Stornelli et al., 2009). Second, the pattern of findings was mixed with some studies reporting positive relations between negative affect and both perfectionism dimensions (e.g., Stornelli et al., 2009) whereas other studies reported positive relations between negative affect and perfectionistic concerns only (Harvey et al., 2017). Furthermore, only some of the studies examined the unique effects of perfectionistic standards and perfectionistic concerns by statistically controlling for the overlap between the two dimensions of perfectionism (e.g., Damian et al., 2014; Harvey et al., 2017) whereas others did not (e.g., Cumming & Duda, 2012; Stornelli et al., 2009). However, controlling for the dimensions' overlap is important as it has been shown that perfectionistic standards often show positive correlations with outcomes that are considered "adaptive" (such as positive affect) only when the negative effect of perfectionistic concerns is controlled for. Also,

when controlling for the dimensions' overlap, the positive relations with outcomes that are considered "maladaptive" (such as negative affect) may become nonsignificant (R. W. Hill et al., 2010; Stoeber & Otto, 2006; see also Stoeber & Gaudreau, 2017). Third, and finally, the only longitudinal studies examining perfectionism and general affect (i.e., not daily affect) conducted so far (Milyavskaya et al., 2014; Moore et al., 2018) examined emerging adults and found perfectionism to be a predictor of general affect, but did not examine any inverse relations (affect predicting perfectionism). Consequently, the hypothesis that general affect may be a factor in the development of perfectionism has not yet been tested empirically.

Against this background, the present study represents the first investigation of the bidirectional longitudinal relations between perfectionism and general affect in adolescents. The study examined a large sample of adolescents and employed a longitudinal design with three time points spaced four to five months apart. Based on both the reciprocal relations model and the theoretical model proposed by Flett et al. (2002), as well as on findings from cross-sectional studies controlling for the overlap between the two perfectionism dimensions (e.g., Damian et al., 2014; Harvey et al., 2017), we expected to find reciprocal positive longitudinal relations between perfectionistic standards and positive affect as well as reciprocal positive relations between perfectionistic concerns and negative affect.

2. Method

2.1 Participants and Procedure

Data for the present study were drawn from a larger three-wave longitudinal project on perfectionism. Previously published results from this data set differ from the present study by focusing on anxiety symptoms (citation masked for review), academic achievement and efficacy (citation masked for review), and school engagement (citation masked for review). A sample of

adolescents of Romanian ethnicity attending 6th to 12th grade of two public schools was recruited for a longitudinal study with three time points over three academic semesters. Data collection for Time 1 (T1) took place at the end of the second semester of the academic year, for Time 2 (T2) five months later in the first semester of the next academic year, and for Time 3 (T3) four months later in the second semester. The total sample comprised 489 adolescents (54% female) of whom 44% were in early-to-middle adolescence (aged 12-15 years) and 56% were in middle-to-late adolescence (aged 16-19 years). The mean age of students at T1 was 15.9 years (*SD* = 1.8). At all time points, students completed the same paper-and-pencil questionnaire in the classroom during school hours. Students 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 participating 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: Students could opt out of the study and instead do homework or other school activities, but fewer than 1% opted out.

2.2 Measures

To measure perfectionism 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"). Concern over mistakes and doubts about actions were collapsed into one variable labeled perfectionistic concerns (Stöber, 1998). The FMPS is the most widely used measure of

perfectionism and three FMPS subscales has been used in numerous studies as measure of perfectionistic strivings and perfectionistic concerns (Stoeber, 2018). Items were presented with the scale's standard instructions and a response scale from 1 (*always false for me*) to 5 (*always true for me*).

To measure general affect, we used the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) capturing general positive affect (10 items; e.g., "interested," "excited") and general negative affect (10 items; e.g., "distressed," "afraid"). The PANAS is a widely-used reliable and valid measure of general affect that has been used in previous studies with adolescents and has demonstrated robust psychometric properties (e.g., Crawford & Henry, 2004). Items were presented with the scale's "General" time instruction ("Indicate to what extent you generally feel this way, that is, how you feel on the average") and a response scale from 1 (*very slightly or not at all*) to 5 (*extremely*).

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. All scales had been previously tested and demonstrated reliability and validity in studies with Romanian adolescents (e.g., Damian et al., 2014; Damian et al., 2017; Domocus & Damian, 2018). Scale scores were computed by averaging responses across items (mean item scores). Cronbach's alphas for all scales can be found in Table 1.

2.3 Data Screening

Of the total sample, 236 adolescents (48%) participated at all time points, 147 adolescents (30%) participated at two time points whereas 106 adolescents (21%) participated at one time point. Furthermore, 2% of item responses in the completed questionnaires were missing. Consequently, we compared participants with and without missing data using 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 any missing data were likely to be missing at random. Hence, there is no evidence of an effect of dropout on any of the measured variables. Next, we inspected the reliability of the combined scale scores by computing Cronbach's alphas. As Table 1 shows, all scores showed good to excellent reliability as indicated by alphas ≥ .80.

With respect to effect size expectations, it is difficult to refer to previous studies because there are not many cross-lagged studies in the literature on perfectionism and affective symptoms. In addition, the studies used different time lags than our study, and some of the studies also used different statistical approaches. However, significant longitudinal cross-lagged standardized coefficients ranged from .09 to .20, and so we expected effect sizes for our study that would fall into this interval (Damian, Negru-Subtirica et al., 2017; Levine et al., 2019; Stricker et al., 2019). However, it is important to take into account that the smaller magnitude of the standardized coefficients needs to be interpreted considering that longitudinal models with autoregressive components control for stability effects when predicting change, which eliminates a significant amount of the variance in the outcome variables (Adachi & Willoughby, 2015). Furthermore, a post-hoc power analysis we conducted using GPower 3.1.9.7 (Faul et al., 2009) indicated that our sample size provided power of 99.89% to estimate a correlation coefficient of .21 at the 5% significance level (which is the typical effect size in social/personality psychology; Richard et al., 2003). To estimate a correlation coefficient of .09 at the 5% significance level, our sample size provided a power of 51%. Based on our given sample size (N = 489, significance level = 0.05, power = 80%), the sensitivity analysis conducted in GPower showed that our cross-

lagged longitudinal model was able to detect effects that are higher than .13 [lower critical r = –.09, upper critical r = .09].

Finally, we tested whether the two dimensions of perfectionism and affect 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 χ^2, Comparative Fit Index [CFI], Root Mean Square Error of Approximation [RMSEA]) based on the following three criteria of which at least two had to be met: $\Delta\chi^2$ significant at $p < .05$, ΔCFI ≥ –.010, and ΔRMSEA ≥ .015 (Chen, 2007; Cheung & Rensvold, 2002). All change indices were nonsignificant, indicating longitudinal measurement invariance for all constructs (perfectionistic standards and concerns: $\Delta\chi^2$ [36] = 49.37, p = .07, ΔCFI = –.002, ΔRMSEA = .001; positive and negative affect: $\Delta\chi^2$ [36] = 40.28, p = .29, ΔCFI = –.001, ΔRMSEA = .001).

3. Results

Means, standard deviations, and bivariate correlations presented in Table 1 were estimated in M*plus* 8.4 (Muthén & Muthén, 1998-2017) using full information maximum likelihood (FIML) which is the recommended method for estimating missing data (Graham, 2009). All output files including syntax and results (including data needed to reproduce the results as well as exact p values) can be found on the Open Science Framework (https://osf.io/kpeh2/?view_only=25214e38e5f14b49b607aeb1604e1102).

As can be seen in Table 1, adolescents reported higher mean levels of perfectionistic standards than perfectionistic concerns and higher mean levels of positive affect than negative affect. Also, bivariate correlations showed large positive associations between perfectionistic standards and concerns and small negative associations between positive and negative affect. In

addition, perfectionistic standards showed small positive correlations with both positive and negative affect whereas perfectionistic concerns showed medium positive correlations only with negative affect.

3.1 Cross-Lagged Analyses

To examine the longitudinal relations between perfectionism and general affect, we conducted cross-lagged analyses in M*plus* using the maximum likelihood robust estimator (MLR; Satorra & Bentler, 1994) to account for non-normality and non-independence of the data. We followed a model comparison approach (Kline, 2010) and evaluated the model fit through multiple indices (Byrne, 2012): the 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 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 standards, perfectionistic concerns, positive affect, and negative affect. In the model, perfectionistic standards and perfectionistic concerns at T1 predicted positive affect and negative affect at T2, and positive affect and negative affect at T1 predicted perfectionistic standards and perfectionistic concerns at T2. The same effects were estimated from T2 to T3. In addition, we controlled for first-order autoregressive paths (i.e., stability paths from T1 to T2 and from T2 to T3) and second-order autoregressive paths (i.e., stability paths from T1 to T3) 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). Finally, we tested indirect effects by means of the indirect command procedure available in M*plus* (Muthén & Muthén, 1998-2017).

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 $p < .05$, $\Delta CFI \geq -.010$, and $\Delta RMSEA \geq .015$ (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, all estimated coefficients including 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 positive affect to perfectionistic standards and a positive bidirectional effect between perfectionistic concerns and negative affect. Moreover, two significant indirect effects indicated mediational mechanisms (all indirect effects are reported in Table 4). Namely, perfectionistic concerns at Time 2 mediated the relation between negative affect at Time 1 and negative affect at Time 3 whereas negative affect at Time 2 mediated the relation between perfectionistic concerns at Time 1 and perfectionistic concerns at Time 3.

3.2 Additional Analyses

Finally, we explored whether the model was invariant across age groups and gender. To

this effect, we conducted multi-group analyses examining whether the cross-lagged paths were significantly moderated by age group (0 = 12-15 years, 1 = 16-19 years) and gender (0 = male, 1 = female). Results suggested that the cross-lagged paths were not moderated by age group ($\Delta\chi^2[8] = 9.51$, $p = .30$, ΔCFI = –.002, ΔRMSEA = –.001) nor were they moderated by gender ($\Delta\chi^2[8] = 6.65$, $p = .57$, ΔCFI = .001, ΔRMSEA = –.003) as all three change indices were nonsignificant in both cases. Consequently, the model shown in Figure 1 fitted equally well for students in early-to-middle adolescence (12-15 years) and students in middle-to-late adolescence (16-19 years), as well as for boys and girls.

4. Discussion

Presenting the first investigation of the longitudinal interplay between perfectionism and general affect, the present study examined a large sample of adolescents aged 12-19 years using a longitudinal design with three waves spaced four to five months. As expected, perfectionistic standards showed positive longitudinal relations with positive affect, but not bidirectional relations: Positive affect predicted relative increases in perfectionistic standards over time, but surprisingly perfectionistic standards did not predict increases in positive affect. In contrast, perfectionistic concerns and negative affect showed bidirectional positive longitudinal relations, as was expected: Perfectionistic concerns predicted relative increases in negative affect over time, and negative affect predicted relative increases in perfectionistic concerns. In contrast, perfectionistic standards and negative affect showed only positive cross-sectional relations (within-time correlations), but no longitudinal relations whereas perfectionistic concerns did not show any relations with positive affect neither cross-sectionally nor longitudinally. Because the present results are in line with theory and the research coming from different countries with

different cultures (e.g., Canada, Germany, Portugal, the UK, and the USA), it can be expected that the present results may generalize to other Western countries and cultures. Also, Essau et al. (2008) showed that the relation between perfectionism and anxiety symptoms is the same in both Chinese and German adolescent students. Additionally, Kobori and Tanno (2005) showed in a study with Japanese university students that self-oriented perfectionism was associated with more positive affect whereas socially prescribed perfectionism was associated with less positive and more negative affect. Therefore, it can be expected that the present results also generalize to non-Western countries and cultures (e.g., China, Japan). Finally, additional analyses showed that these results may generalize to younger and older adolescents as well as to boys and girls.

4.1 The Unidirectional Relation between Perfectionistic Standards and Positive Affect

As regards perfectionistic standards and positive affect, the study is the first to provide supportive evidence that positive affect plays a role in the development of perfectionistic standards. Adolescents who experienced high levels of general positive affect showed relative increases in perfectionistic standards over time. This suggests that adolescents who usually feel positive affect (such as being interested, excited, active, determined) tend to set higher and higher standards of performance for themselves, and so the findings indicate that general positive affect may serve as a motivational factor in pursuing higher goals of performance over time. Future studies may expand on these results and investigate potential mediators of this relationship, in particular whether intrinsic motivation might play a mediating role in this relation, as positive affect may be a factor for increasing intrinsic motivation which in turn may increase personal standards of performance.

In line with Flett et al.'s (2002) model of perfectionism development taking individual

factors into account, our findings expand on previous findings showing that perfectionistic standards are longitudinally predicted by positive personality traits such as high conscientiousness (Stoeber et al., 2009) and by academic success and efficacy beliefs (Damian et al., 2017a) as well as by school satisfaction, which is a construct entailing a positive affective component (Stricker et al., 2019). Furthermore, these results support the complication model (Bagby et al., 2008) positing that affective symptoms represent antecedents of personality and thus contribute to longitudinal changes in personality. However, the present findings expand on the complication model which has mostly focused on negative affect, by showing that also positive affect may yield longitudinal changes in personality. Personality change can result not only from negative experiences, but also from positive experiences.

Moreover, our findings are in line with findings from cross-sectional studies indicating that perfectionistic standards are associated with positive affect (e.g., Cumming & Duda, 2012; Damian et al., 2014). However, the longitudinal effect of perfectionistic standards on positive affect was nonsignificant. This suggests that the longitudinal effect of perfectionistic standards on positive affect could unfold over shorter or longer time spans than investigated. Moreover and more importantly, the finding suggests that general positive affect may be an antecedent rather than an outcome of perfectionistic standards in this time frame. Overall, the present findings suggest that—when examined longitudinally—the relations between perfectionistic standards and positive affect are more complex than suggested by cross-sectional findings.

Finally, this finding is noteworthy for the debate in the literature on the adaptiveness of perfectionistic standards (Flett & Hewitt, 2006; Stoeber & Otto, 2006). Here it is important to note that the present study found significant positive correlations between perfectionistic standards and negative affect, which is in line with other studies showing that domain-specific

perfectionistic standards are associated with more stress (Levine & Milyavskaya, 2018). Thus the question of whether perfectionistic standards are "adaptive" is still under debate, particularly as some researchers argue that perfectionism can never be healthy (Greenspon, 2002) and others suggest that the positive relations perfectionistic standards show with psychological adjustment do not reflect perfectionism, but a striving for excellence or a conscientious achievement striving (Flett & Hewitt, 2006; A. P. Hill, 2014). Future studies may want to further investigate whether high positive affect is partly responsible for the positive relations that perfectionistic standards show with different adaptive outcomes or whether there are mediators involved in this relation (e.g., high academic achievement; cf. Damian et al., 2017; Madigan, 2019).

4.2 The Bidirectional Relation between Perfectionistic Concerns and Negative Affect

As regards perfectionistic concerns and negative affect, it is noteworthy that the present study found negative affect to represent both an antecedent and an outcome of perfectionistic concerns when examined longitudinally. Adolescents who reported high levels of general negative affect showed relative increases in perfectionistic concerns; and adolescents who reported high levels of perfectionistic concerns showed relative increases in negative affect. This finding suggests that adolescents who usually feel negative affect (such as being distressed, upset, guilty, scared) tend to be increasingly more concerned over making mistakes and more doubtful about the actions they undertake every day. Conversely, adolescents who are generally more concerned over making mistakes and more doubtful about their daily actions tend to feel more and more general negative affect (e.g., feel more distressed, upset, guilty, scared). Moreover and more importantly, negative affect and perfectionistic concerns both emerged as mediators in their longitudinal relations which represents novel evidence that they provide

mutual mechanisms of reinforcement over time, thus creating a vicious cycle of perfectionistic concerns increasing negative affect and vice versa.

The present study is the first to find that perfectionistic concerns may not only have negative affect as an outcome, but also partly stem from experiencing high negative affect. This is in line with Flett et al.'s (2002) proposition that individual factors play a role in the development of perfectionism. This is also in line with studies supporting the reciprocal relations model which proposes that perfectionism and affective symptoms reinforce each other over time (McGrath et al., 2012; Vaillancourt & Haltigan, 2018). Thus, in the case of the relation between perfectionistic concerns and negative affect, complication/scar and vulnerability models are not competing models (Bagby et al., 2008), but complement each other in an integrative model positing reciprocal effects (Zuroff et al., 1999). It dovetails with previous longitudinal results showing that perfectionistic concerns predict increased negative affect across time (Milyavskaya et al., 2014; Moore et al., 2018). Moreover, it is in line with cross-sectional findings indicating that perfectionistic concerns predict negative affect when controlling for the overlap with perfectionistic standards (Damian et al., 2014; Harvey et al., 2017). Furthermore, the finding underscores the conception of perfectionistic concerns as being inherently "maladaptive" capturing those aspects of perfectionism that are responsible for the positive relations perfectionism shows with indicators of psychological maladjustment (Lo & Abbot, 2013; Stoeber & Otto, 2006). In addition, the finding adds to our understanding of the development of perfectionistic concerns. Because previous research has found that perfectionistic concerns are longitudinally associated with difficulties in emotion regulation in adolescents over a short period of only one month (Vois & Damian, 2020), it may be that unhealthy strategies (i.e., avoidant coping, rumination) of dealing with negative affect are an explanatory mechanism of

why perfectionistic concerns may increase as a function of negative affect (see Dunkley, 2017; O'Connor et al., 2007). Future research should further deepen this understanding by investigating whether learning healthy strategies of dealing with negative affect may help children and adolescents in reducing their perfectionistic concerns or preventing perfectionistic concerns to develop.

4.3 Limitations

The present study has a number of limitations. First, the study did not investigate potential mediating factors such as intrinsic motivation (in the case of positive affect) or emotion regulation (in the case of negative affect) which may be partly responsible for the relation between perfectionism and general affect. Consequently, future studies may want to examine whether intrinsic motivation and/or affect regulation plays a role in these relations (cf. Castro, et al., 2017). Second, the present findings may be limited to the particular time span (four to five months) and age group (12-19 years) that were investigated. For example, the expected effect of perfectionistic standards on positive affect was not detected which may be due to the fact that some effects unfold over shorter periods of time whereas others over longer periods of time (cf. Dormann & Griffin, 2015). Future studies may therefore want to investigate if the present findings generalize to other time spans and to other age groups (e.g., children under 12 years of age and emerging adults over 19 years of age). Finally, the results of the present study are limited to the conception of positive and negative affect captured by the PANAS (Watson et al., 1988). In particular, positive affect measured with the PANAS includes more intense positive emotions reflecting joy, interest, and activation. Consequently, future research may expand on the present findings by using different measures of positive and negative affect capturing less intense positive emotions than the PANAS (e.g., the 9-Item Affect Scale; Emmons, 1992).

4.4 Conclusions

Notwithstanding these limitations, the present findings have important implications for our understanding of the development of perfectionism and its relations with general affect. First, the development of perfectionism is still poorly understood because few longitudinal studies have been conducted (Stoeber et al., 2018). Second, less is known about the specific development of perfectionistic standards compared to perfectionistic concerns. Third, the cross-sectional relations between perfectionism and general affect are usually interpreted such that general affect is an outcome of perfectionism (through the lens of the vulnerability model). This interpretation, however, was only partially supported in the present study because negative affect was both an antecedent and an outcome of perfectionistic concerns (supporting the reciprocal relations model), whereas positive affect was only an antecedent of perfectionistic standards (supporting and expanding on the complication model by including positive affect as a factor of change in personality). As perfectionism is a relevant personality disposition for numerous life domains (Stoeber & Stoeber, 2009) with implications on mental health, it is important to pinpoint the factors that contribute to its development. Also, from a practical perspective, the present findings contribute to a better understanding of the affective experiences of adolescents with high levels of perfectionism and point to the importance of these affective experiences in developing perfectionism. Thus, interventions on perfectionism should also focus on affect by helping adolescents make sense of their affective experiences and regulate the intense affect they experience in a healthy manner in order to prevent the development of perfectionism. Consequently, the present study makes a significant novel contribution to the literature being the first longitudinal study to show that general positive and negative affect represent factors in the development of perfectionism in adolescence. Moreover, it is the first to show that negative

affect and perfectionistic concerns serve each other as mechanisms of reinforcement over time.

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Table 1

Descriptive Statistics and Bivariate Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Perfectionistic standards (T1)													
2. Perfectionistic concerns (T1)	.55***												
3. Positive affect (T1)	.19***	.06											
4. Negative affect (T1)	.11*	.36***	–.19***										
5. Perfectionistic standards (T2)	.65***	.36***	.21***	.09									
6. Perfectionistic concerns (T2)	.38***	.66***	.06	.30***	.49***								
7. Positive affect (T2)	.07	–.04	.49***	–.27***	.19***	.01							
8. Negative affect (T2)	.12**	.37***	–.11*	.55***	.18***	.43***	–.29***						
9. Perfectionistic standards (T3)	.53***	.30***	.14**	.05	.66***	.41***	.14**	.16***					
10. Perfectionistic concerns (T3)	.32***	.59***	.03	.23***	.38***	.67***	–.00	.23***	.58***				

11. Positive affect (T3)	.16***	–.01	.55***	–.14**	.18***	.07	.56***	–.10*	.23***	.01			
12. Negative affect (T3)	.15***	.36***	–.14**	.51***	.22***	.36***	–.22***	.60***	.18***	.47***	–.24***		
13. Age	.20***	.00	–.12**	–.02	.21***	–.05	–.00	–.03	.09*	.02	–.03	.05	
14. Gender (female)	–.05	.01	–.11*	.18***	–.02	–.02	–.13**	.18***	.12**	–.03	.02	.17***	–.10*
M	2.87	2.16	3.23	2.15	2.88	2.13	3.26	2.30	2.82	2.12	3.17	2.32	15.87
SD	0.83	0.71	0.66	0.73	0.84	0.69	0.66	0.76	0.85	0.73	0.70	0.74	1.77
Cronbach's alpha	.80	.87	.80	.84	.80	.87	.82	.85	.83	.90	.84	.86	n/a

Note. N = 489. All scores are mean scores (see Data Screening section for details). T1 = Time 1; T2 = Time 2 (T1 + 5 months); T3 = Time 3 (T2 + 4 months). Age = age at Time 1. Gender (female) was coded 0 = male, 1 = female. Cronbach's alphas for age is not applicable (n/a).

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 2

Cross-Lagged Model Fit Indices and Model Comparison

	Model fit indices									Model comparisons			
Model	χ^2	SF	*df*	CFI	TLI	RMSEA	SRMR	AIC	BIC	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA
Model 1	33.89	1.11	28	.995	.990	.021	.037	8123.08	8383.01	9.13	8	–.001	–.001
Model 2	24.73	1.13	20	.996	.989	.022	.031	8129.47	8422.94				

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.

Table 3

Results of the Cross-Lagged Model

Stability paths	**T1-T2**	**T2-T3**	**T1-T3**
Perfectionistic standards	.62*** [.54, .70]	.50*** [.38, .61]	.19*** [.06, .31]
Perfectionistic concerns	.62*** [.55, .69]	.45*** [.35, .55]	.25*** [.15, .35]
Positive affect	.48*** [.37, .58]	.36*** [.24, .49]	.37*** [.25, .49]
Negative affect	.48*** [.40, .57]	.38*** [.26, .50]	.27*** [.15, .39]
Within-Time Correlations	**T1**	**T2**	**T3**
PS ↔ PC	.55*** [.48, .62]	.41*** [.31, .52]	.54*** [.45, .62]
PS ↔ PA	.19*** [.08, .30]	.18** [.07, .28]	.18** [.07, .29]
PS ↔ NA	.11* [.01, .22]	.15* [.03, .26]	.03 [–.10, .15]
PC ↔ PA	.06 [–.05, .17]	.05 [–.07, .17]	–.04 [–.16, .08]
PC ↔ NA	.36*** [.26, .46]	.26*** [.15, .36]	.32*** [.21, .43]
PA ↔ NA	–.19** [–.30, –.07]	–.22*** [–.33, –.11]	–.24*** [–.37, –.11]
Cross-lagged paths	**T1 → T2**	**T2 → T3**	
PS → PA	.03 [–.06, .12]	.03 [–.05, .11]	
PS → NA	.00 [–.07, .07]	.00 [–.07, .07]	
PC → PA	–.04 [–.13, .04]	–.04 [–.12, .04]	
PC → NA	.16*** [.07, .24]	.15*** [.07, .24]	
PA → PS	.07* [.00, .15]	.07* [.00, .14]	
PA → PC	.06 [–.01, .13]	.06 [–.01, .12]	
NA → PS	.00 [–.07, .07]	.00 [–.07, .07]	

NA → PC	.16*** [.07, .24]	.15*** [.07, .24]

Note. N = 489. PS = personal standards; PC = perfectionistic concerns; PA = positive affect; NA = negative affect; […] = 95% confidence interval; T1 = Time 1; T2 = Time 2 (T1 + 5 months); T3 = Time 3 (T2 + 4 months). $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 4

Mediation Analyses: Significant Standardized Indirect Effects

	Indirect effects [95% CI]
Perfectionistic concerns T1 → negative affect T2 → perfectionistic concerns T3	.016* [.003, .029]
Negative affect T1 → perfectionistic concerns T2 → negative affect T3	.016* [.003, .029]

Note. $^{*}p < .05$. T1 = Time 1; T2 = Time 2 (T1 + 5 months); T3 = Time 3 (T2 + 4 months). 95% CI = 95% confidence interval.

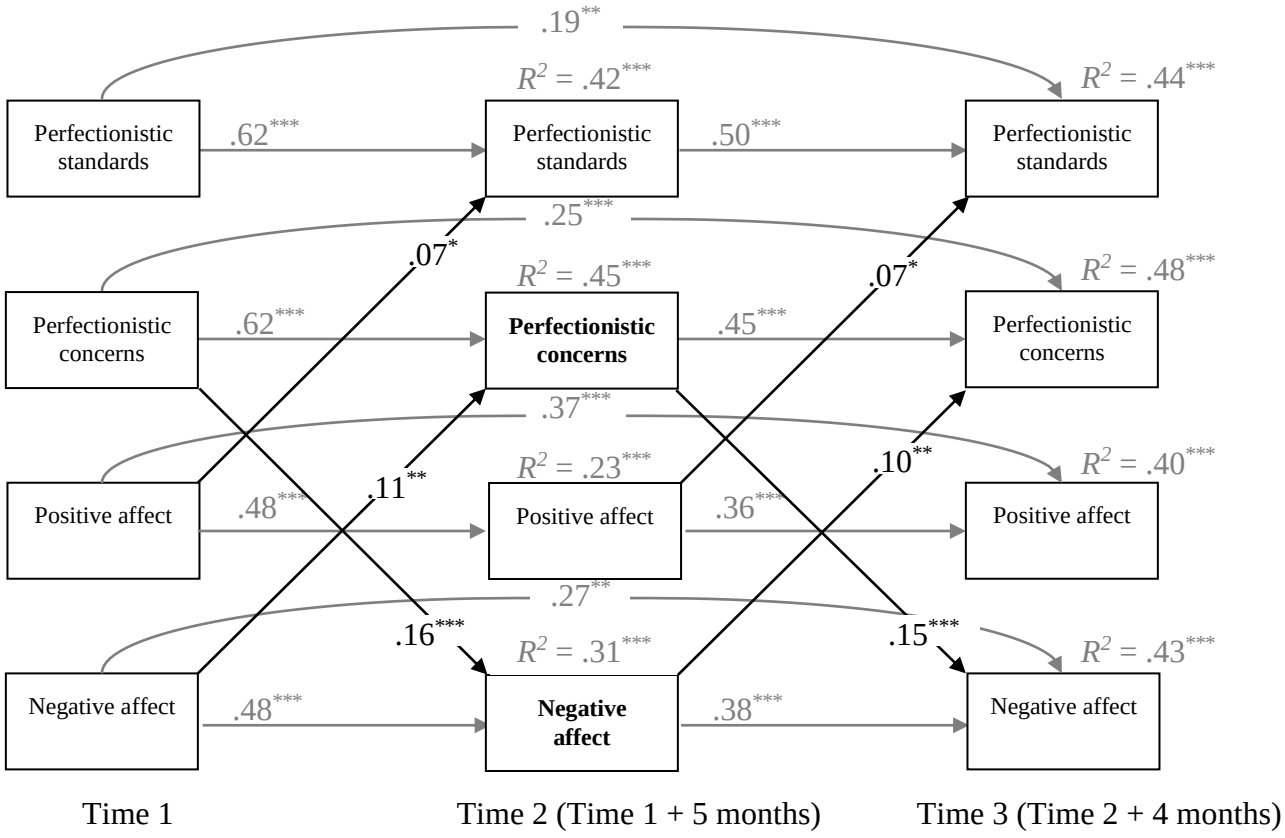

Figure 1. N = 489. Cross-lagged model between perfectionism and affect dimensions. To reduce model complexity, only significant longitudinal relations ($p < .05$) are shown. See Table 3 for all coefficients and confidence intervals. Boldfaced constructs at Time 2 represent significant mediator variables whereas bolded arrows show the directions of indirect effects (see Cross-Lagged Analyses for details). $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.