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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

All procedures performed in this study involving human participants were in accordance with the

ethical standards of the Ethics Committee of the Babes-Bolyai University (Romania) and with

the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants (and from their parents, if

minors) included in the study.

Abstract

Education has a strong impact on adolescent development. This study investigated the complex longitudinal associations between educational identity processes, academic achievement, and perfectionism. Using a 4-wave design ($N = 744$ adolescents, $M_{age} = 15.2$ years, 55% girls), results showed that self-oriented perfectionism mediates the longitudinal relation between academic achievement and educational commitment, whereas educational commitment mediates the longitudinal relation between self-oriented perfectionism and academic achievement. Also, a unidirectional positive direct link from educational in-depth exploration to socially prescribed perfectionism was found, while self-oriented perfectionism mediated the positive relation between academic achievement and exploration. Finally, higher academic achievement led to decreases in educational reconsideration of commitment, whereas socially prescribed perfectionism predicted increases in educational reconsideration of commitment and decreases in academic achievement.

Keywords: educational identity; academic achievement; perfectionism; longitudinal analyses; mediation

The Complex Story of Educational Identity in Adolescence: Longitudinal Relations with

Academic Achievement and Perfectionism

Education and educational settings have a strong impact on adolescents, significantly affecting personal, vocational, and relational development in this timeframe and beyond. In this context, understanding how adolescents' educational identity is developed is of paramount importance. Existing longitudinal research has pointed out that adolescents' educational identity is intricately linked to their academic achievement (Pop et al., 2016) and to their personality formation (Hatano et al., 2017). Nevertheless, to date no study has approached the longitudinal interplay of educational identity processes, taking into account both academic achievement and a core personality disposition in adolescence: perfectionism. As many educational systems praise and reward exceedingly high academic performance, pointing out to the key role of performing perfectly at school (Madigan, 2019), the personality disposition of perfectionism may play an important part in the educational identity-academic achievement relation. This four-wave longitudinal study set out to investigate these associations, tapping into the role of multiple dimensions of perfectionism (i.e., self-oriented and socially prescribed perfectionism).

Educational Identity: Three Meaningful Processes in Adolescent Psychosocial Development

Educational identity revolves around the goals and values students uphold, which are relevant for their educational advancement (Negru-Subtirica et al., 2018). Currently, the identity model that best captures this domain of identity is the *three-factor identity model* (Crocetti, 2017). This model conceptualizes identity formation as an interplay of three inter-related educational identity processes: commitment (strong allegiance to the pursuit of a current goal), in-depth exploration (systematic analysis of a current goal), and reconsideration of commitment (relinquishment of a current goal that is perceived as no longer satisfactory). These

processes co-exist in the dynamic of two identity cycles: the identity formation cycle that creates strong educational commitments by renouncing no longer satisfactory goals and the identity maintenance cycle that strengthens current educational commitments through in-depth exploratory pursuits (Crocetti, 2018; Meeus, 2018).

Existing research showed that strong educational commitments enhance vocational commitments (Negru-Subtirica & Pop, 2018) and are positively related to youth well-being (Karaś et al., 2015). In-depth educational exploration entails detailed evaluations of current educational commitments. Hence, it can be linked to anxiety and depressive symptoms (for a review, see Crocetti, 2017) possibly due to the discomfort of unveiling an inadequate commitment, but also to openness to experience (Hatano et al., 2017), as it may help the clarification of educational commitment issues. These findings indicate that in-depth exploration can be emotionally taxing for the adolescent, but that it also contributes to creating firm and flexible educational commitments (Negru-Subtirica & Pop, 2018; Negru-Subtirica et al., 2018). Reconsideration of educational commitments seems to have the strongest negative impact on personal functioning in the short-term, as it has been linked to maladaptive cognitive processing (Negru-Subtirica et al., 2017) and relational difficulties (Crocetti et al., 2017). Overall, this corpus of evidence shows that the three identity processes have a meaningful and distinct pattern of associations with indicators of adolescents' psychosocial development (Crocetti, 2018).

Educational Identity and Academic Achievement: GPA as a Self-defining Tool

Education is a core identity domain across adolescence and compared to other identity domains (e.g., relationships), is viewed as a normative, less flexible domain in this developmental timeframe (Meeus, 2016). Its dynamic is closely linked to educational

performance standards and to the structure of educational systems, with academic achievement playing a key role (Pop et al., 2016). Across an academic year, adolescents with high levels of academic achievement, measured with their Grade Point Average (GPA), tended to become more committed to their education and to have lower levels in their reconsideration of educational commitments (Pop et al., 2016). This unidirectional link from GPA to identity processes underscored the self-defining role that academic achievement plays in adolescence, as it drove the educational identity formation cycle. The same directionality of effects was depicted in another longitudinal study, indicating that GPA also drives personality formation in adolescence, at between- and within-person levels (Negru-Subtirica et al., 2020). It may be that in educational contexts that capitalize on the role of a high GPA, getting the best grades gradually becomes a goal itself and a self-defining component of school functioning (Möller, Zitzmann, Helm, Machts, & Wolff, 2020). High GPA could reinforce strong educational commitments across time and reduce reconsideration of commitment because it represents a confirmation of the adolescent's social standing in their school context and a means for procuring easy access to a university education.

Educational Identity, Academic Achievement, and Perfectionism: A Complex Unrevealed Story

Many educational systems are built on normative performance requirements that students must attain, which pre-define levels of academic achievement (e.g., high, medium, or low academic achievement). These normative performance requirements often hint at the importance of getting very good grades, as a prerequisite of becoming a high-achieving student. Moreover, in cultural contexts where good grades are mandatory for accessing high-quality education for

the future, the stakes are even higher, with students striving to get the best grades (Curran & Hill, 2019). Hence, adolescents' educational identities and academic achievement are many times closely interwoven with their perfectionism, as the prototype of an achieved student is often the student who has perfect grades and who performs to perfection in all school subjects.

Perfectionism is a multidimensional personality disposition, characterized by exceedingly high performance standards that are very difficult, even impossible to attain (Stoeber et al., 2018). These performance standards can be self-set (self-oriented perfectionism) or are viewed as being set by significant others, like teachers or parents (socially prescribed perfectionism). A strong link between perfectionism and identity has been long postulated in clinical psychology and psychotherapy (see Hewitt et al., 2017 for an in-depth analysis), but has been backed up only recently by longitudinal research in adolescence. A four-wave study has shown that, on the one hand, self-oriented perfectionism leads to increases in identity commitments and exploration in depth for the domain of future plans, while socially prescribed perfectionism leads to increases in a maladaptive form of identity exploration, ruminative exploration which is marked by worry and indecision regarding one's path for the future (Negru-Subtirica et al., 2021). On the other hand, the same study pointed out that identity exploration can be an ambivalent process, in that both in depth and ruminative exploration lead to increases in socially prescribed perfectionism across two academic years.

Longitudinal research on the role of perfectionism in the educational identity - academic achievement relationship is scarce. To date, no longitudinal study has approached this complex interplay. Regarding the specific relationship between perfectionism and academic achievement, theory has posited that academic achievement represents both an antecedent and a consequence of perfectionism (Flett et al., 2002). In a three-wave panel study, Damian, Stoeber et al. (2017)

found that academic achievement (i.e., GPA) positively predicted both self-oriented and socially prescribed perfectionism, while only increases in self-oriented perfectionism were linked with increases in GPA across time. Nevertheless, when adolescents' level of academic self-efficacy was taken into account, only the relations from GPA to perfectionism remained significant, indicating that self-related structures and processes, like self-efficacy, play an important role in this interplay. These results were recently replicated in a six-wave panel study with adolescents which again showed positive longitudinal effects from GPA to both self-oriented and socially prescribed perfectionism (Endleman, Brittain, & Vaillancourt, 2022). A recent review on mostly cross-sectional studies pointed out that self-oriented perfectionism is positively related to and socially prescribed perfectionism is negatively linked with academic achievement (Madigan, 2019). Though the inferred directionality of effects in this meta-analysis was from perfectionism to academic achievement, nevertheless, this could not be statistically tested, as most studies (36 from 37 studies included in the analyses) were cross-sectional. Hence, longitudinal studies on the academic achievement – perfectionism interplay are urgently needed for the investigation of directionality of effects.

Perfectionism is built on identity-relevant concerns that greatly impact the personal and social development of adolescents (Hewitt et al., 2017). The theoretical assumption is that perfectionistic adolescents gradually define themselves through a perpetual and incomplete striving for exceedingly difficult goals, self-set or perceived to be set by others. These perfectionistic goals are endorsed by increased fear of failure and very high performance standards. The interplay of identity and perfectionism in the educational domain has so far not been approached from a longitudinal perspective in adolescents. One cross-sectional study on university students pointed out that self-oriented perfectionism was positively linked to

educational commitment and in-depth exploration, while socially prescribed perfectionism was negatively related to educational commitment and positively to reconsideration of commitment (Piotrowski, 2019). Nevertheless, neither the directionality of effects, nor the role of academic achievement in this relation could be tested. Important questions remain open: Is perfectionism an antecedent or a mediator in the longitudinal relation of academic achievement and educational identity? Does educational identity drive changes in academic achievement across time when adolescents' personality disposition of perfectionism is taken into account, or is it the other way around? To address these questions is of utmost importance to shed light on the dynamic of educational systems that stress the role of perfect grades.

Current Study

This four-wave longitudinal study aimed to tackle how educational identity processes unfold during two academic years, considering the role of academic achievement (i.e., GPA) and perfectionism. Building upon the theoretical background and the literature reviewed above, a nuanced pattern of associations was examined. In particular, both direct effects and indirect (mediational) ones were hypothesized to explain dynamic associations among educational identity processes, GPA, and perfectionism.

For direct effects, GPA was hypothesized to drive increases in educational identity commitments and in-depth exploration and decreases in educational reconsideration. GPA can be an indicator of a student's performance standing in the school context and it has core importance in the development of the academic self-concept (Marsh et al., 2018; Moller et al., 2020). Previous longitudinal studies have shown a predominantly unidirectional effect, from GPA to core self-structures (personality traits, Negru-Subtirica et al., 2020; educational identity, Pop et al 2016). Also, additional hypotheses regarded associations between GPA and perfectionism

were advanced and they were expected to differ for the two dimensions of perfectionism. In light of the findings of the longitudinal study of Damian et al. (2017), positive bidirectional longitudinal associations between GPA and self-oriented perfectionism were expected, whereas a positive unidirectional effect from GPA to socially prescribed was expected, but not the other way around.

Regarding possible indirect (mediation) effects, perfectionism was hypothesized to mediate the longitudinal relation between GPA (predictor) and educational identity processes (outcome), as it may be that perfectionistic adolescents react differently to higher or lower grades, in terms of how they construct and maintain their educational identity commitments. In this respect, the study was exploratory and could not formulate specific hypotheses for the two dimensions of perfectionism, as there is no previous empirical evidence to sustain them. Furthermore, possible mediating effects of identity processes in the longitudinal associations between perfectionism and GPA were explored.

Methods

Participants and Procedure

This study uses data from the four-wave longitudinal project PERSEIDA (Perfectionism in Self and Identity Development in Adolescence; Damian et al., 2021; Negru-Subtirica et al., 2021). The sample comprised 744 adolescents at Time 1 (*Mage* = 15.2 years, *SD* = 1.9, range = 11-19 years; 55% girls). All adolescents were Caucasian and of Romanian ethnicity. The PERSEIDA project was approved by the ethical committee of the first author's university. Collaboration protocols were signed with three public schools from the North-West part of Romania. Adolescents and parents were informed about the study through a written letter distributed directly to the adolescents. Adolescent and parental consent were obtained.

Participation in the study was voluntary and confidential with no financial compensation for the participants, and parents could withdraw their child from the study at any time. Adolescents took part in a four-wave longitudinal study with five- to six-month intervals between each wave across two academic years (December 2014 to May 2016). At each time-point, adolescents filled in the same questionnaires in their classrooms during school hours.

Missing Data Analysis

Overall, 24.75% of data were missing from Time 1 to Time 4. Little's (1988) Missing Completely at Random (MCAR) test showed a normed $\chi 2/df$ of 1.11, suggesting that the data were missing at random (Bollen, 1989). Missing data were estimated using the Full Information Maximum Likelihood (FIML) procedure in M*plus* 8 (Muthén & Muthén, 1998-2017).

Measures

Identity Processes. The Utrecht-Management of Identity Commitments Scale (U-MICS; Crocetti et al., 2008; for the validation of the Romanian version see Crocetti, Cieciuch et al., 2015; Dimitrova et al., 2016) was used to measure educational identity processes. The U-MICS comprises 13 items divided into three scales: commitment (5 items; "My education gives me certainty in life"), in-depth exploration (5 items; "I think a lot about my education"), and reconsideration of commitment (3 items; "I often think it would be better to try to find a different education"). Participants responded to all items on a scale from 1 (*not at all*) to 5 (*very much*). Cronbach's alphas for the three scales ranged from .79 to .93 (see Table 1).

Perfectionism. The Child-Adolescent Perfectionism Scale (CAPS; Flett et al., 2016; for the Romanian version see Damian et al., 2013) was used to measure perfectionism. The CAPS comprises 22 items appraising self-oriented perfectionism (12 items; "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"). Participants responded to all items on a scale from 1 (*not at all*) to 5 (*very much*). Cronbach's alphas for the two scales ranged from .77 to .84 (see again Table 1).

Academic Achievement. Participants self-reported their grand point average (GPA) at the end of each semester of the academic years 2014-2015 and 2015-2016. High school self-reported GPA is relatively highly correlated with actual high school GPA ($r = .82$; Credé & Kuncel, 2013) and predicts academic outcomes similar to actual GPA (Baird, 1976). The Romanian grading system uses a 10-point scale with 1 representing the minimum and 10 the maximum grade. A GPA of 5 is the minimum accepted requirement to advance from one semester to the other and from one academic year to the next.

Results

Preliminary Analyses

Descriptive statistics and correlations of the variables across waves were performed in SPSS 25. Results are displayed in Table 1. All the other analyses were conducted in M*plus* 8 using the maximum likelihood robust (MLR) estimator to account for non-normality (Satorra & Bentler, 1994) and the full information maximum likelihood estimator (FIML) to handle missing data (Muthén & Muthén, 1998-2017). 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/2xf5h/?view_only=bf1fd8c79af0404880774415fea17e76).

Cross-lagged Analyses

To examine the longitudinal associations between educational identity processes, perfectionism, and GPA, cross-lagged analyses were conducted with observed variables. Specifically, (a) cross-lagged paths were estimated controlling for (b) stability paths (T1-T2, T2-

T3, T3-T4, T1-T3, T2-T4, and T1-T4); (c) within-time correlations among all variables (at T1,

and correlated changes at T2, T3, and T4); and (d) the effects of the participants' age-group (0 =

early-to-middle adolescents, 1 = middle-to-late adolescents). Since participants were nested

within classrooms, the "type = complex" command (Muthén & Muthén, 1998-2017) was used,

indicating the classroom as a cluster variable, to adjust the standard errors. To model the

longitudinal associations as parsimoniously as possible, time-invariance of (a) adjacent stability

paths (T1-T2, T2-T3, T3-T4); (b) cross-lagged effects (T1-T2, T2-T3, T3-T4); (c) correlated

changes (within-time correlations at T2, T3, and T4); and age-group effects (T1-T2, T1-T3, T1-

T4) was tested. Multiple indices were employed to appraise the data fit for these nested models

corresponding to different hierarchical levels of invariance (see Table 2): the Comparative Fit

Index (CFI) and the Tucker–Lewis index with values > .90 indicating an acceptable fit and

values >.95 an excellent fit; and the Root Mean Square Error of Approximation (RMSEA) and

Standardized Root Mean Square Residual (SRMR) with values < .08 indicating an acceptable

fit and values < .05 a good fit (Byrne, 2012). In addition, 90% CI of the RMSEA was checked:

when the upper bound of this confidence interval is ≤ .10 the model fit can be considered

acceptable (Chen, Curran, Bollen, Kirby, & Paxton, 2008). For establishing differences between

models, at least two of the following three criteria had to be matched: $\Delta\chi_{SB}^2$ significant at $p < .05$

(Satorra & Bentler, 1994), ΔCFI ≥ −.010, and ΔRMSEA ≥ .015 (Chen, 2007).

The results (see Table 2) showed that partial time-invariance could be established for

stability paths, and full time-invariance could be established for cross-lagged effects, correlated

changes, and age-group effects. Thus, the more parsimonious model (M5) including all time-

invariance constraints could be retained as the final one. The fit of this model was very good

(Table 2). Complete model results are available in Table 3. Educational commitment positively

predicted GPA and socially prescribed perfectionism negatively predicted GPA across time. In turn, GPA positively predicted self-oriented perfectionism and negatively predicted reconsideration of educational commitment longitudinally. While educational in-depth exploration positively predicted socially prescribed perfectionism, the latter positively predicted educational reconsideration of commitment. Self-oriented perfectionism was positively linked to educational commitment and in-depth exploration across time.

Regarding within-time correlations (see Table 1), the findings highlighted that within each wave, educational commitment was positively associated with both self-oriented perfectionism and GPA, while reconsideration of educational commitment was positively linked to socially prescribed perfectionism and negatively to GPA. In-depth exploration was positively associated with both self-oriented and socially prescribed perfectionism. GPA and self-oriented perfectionism were positively associated. In addition, at T2, T3, and T4 (correlated changes), significant positive links between changes in educational commitment and in-depth exploration on the one hand and self-oriented perfectionism on the other hand were detected. Moreover, changes in both educational in-depth exploration and reconsideration of commitment were positively linked to changes in socially prescribed perfectionism. Changes in self-oriented perfectionism were positively linked to changes in GPA across time. These results were obtained after controlling for stability paths and autoregressive paths (see Table 3).

Mediation analyses

To examine possible mediation mechanisms, indirect effects were tested through the indirect command procedure available in M*plus* 8 (Muthén & Muthén, 1998-2017). In this manner, it can be tested whether a predictor (measured at Time 1 or Time 2) influenced an outcome (measured at Time 3 or Time 4), via a mediator (assessed at Time 2 or Time 3).

Findings indicated that these mediations were statistically significant: self-oriented perfectionism T1 → commitment T2 → GPA T3 (standardized indirect effect = .005, p = .041); self-oriented perfectionism T2 → commitment T3 → GPA T4 (standardized indirect effect = .004, marginally significant at p = .053); GPA T1 → self-oriented perfectionism T2 → commitment T3 (standardized indirect effect = .004, p = .033); GPA T2 → self-oriented perfectionism T3 → commitment T4 (standardized indirect effect = .004, p = .034); GPA T1 → self-oriented perfectionism T2 → in-depth exploration T3 (standardized indirect effect = .004, p = .045); GPA T2 → self-oriented perfectionism T3 → in-depth exploration T4 (standardized indirect effect = .004, marginally significant at p = .053). These findings indicate that self-oriented perfectionism has an indirect effect on GPA through educational commitment and that GPA has an indirect effect on both educational commitment and in-depth exploration through self-oriented perfectionism.

Discussion

Educational identity is a core identity domain in adolescence, contributing to adaptive self-development in this time-frame and beyond (Meeus, 2016). To date, few studies have approached its dynamic from an identity process perspective, considering longitudinal links with academic achievement in the context of increasing requirements for perfection in academic settings (Madigan, 2019). The current study advances the literature in several directions. First, this study brought important proof on the complex longitudinal reinforcement loop of educational commitments in adolescence. The longitudinal positive relation between academic achievement and educational commitment was mediated by self-oriented perfectionism, while strong educational commitment mediated the longitudinal positive relation between self-oriented perfectionism and academic achievement. These findings highlight the competitive nature and

value of academic achievement, with self-set excessively high performance standards playing a

key role in the strengthening of educational commitments. Second, the current study underscored

the double-edged nature of educational in-depth exploration, as this identity process stimulates

increases in socially prescribed perfectionism across time and it feeds from academic

achievement through self-oriented perfectionism. Third, the study brought additional

longitudinal proof on the debilitating role of educational reconsideration of commitment, which

was fostered by low academic achievement and high socially prescribed perfectionism. These

findings contextualize the dynamic of educational identity across adolescence, pointing out core

levers for future research and interventions studies.

Educational Commitment: A Key Process in Adolescents' Continued Success

With respect to adolescents' educational commitment, the present findings indicate that

this identity process is involved in a complex longitudinal reinforcement loop (for a

schematization, see Figure 2). Namely, the results of mediational analyses showed that self-

oriented perfectionism mediates the longitudinal relation between academic achievement and

educational commitment, whereas educational commitment mediates the longitudinal relation

between self-oriented perfectionism and academic achievement. Thus, on the one hand,

educational commitment gets strengthened over time by being driven by high GPA through

increases in excessively high self-set performance standards. On the other hand, educational

commitment is involved as a mechanism through which excessively high self-set performance

standards lead to increases in academic achievement over time. Thus, these two indirect effects

form together the complex story of adolescents setting themselves on the path of success: High

academically achieving adolescents tend to increase their self-set performance standards which

in turn makes them more committed to their educational path, which in turn makes them more academically successful (i.e., higher GPA), a loop that probably gets continued over time.

These results are not surprising, as they are in line with both theory and the few previous studies. The fact that higher GPA longitudinally predicted increases in self-set excessive performance goals and expectations was in line with the hypotheses and replicated the findings of the three-wave study of Damian et al. (2017). This evidence reconfirms Flett et al.'s (2002) proposition that academic achievement plays an important role in the development of self-oriented perfectionism. This can also be interpreted considering the role of GPA in academic self-formation across adolescence and its core importance in self-evaluation in this developmental timeframe (Marsh et al., 2018). Additionally, these mediated longitudinal links bring proof to the competitive and performance-oriented nature of academic achievement. Self-oriented perfectionism revolves around excessively high personal standards that are self-set and that tend to enforce academic achievement (Damian et al., 2017) and strong identity commitments (Negru-Subtirica et al., 2021) across time. These previous studies integrate personal development dimensions (i.e., academic achievement, identity in the domain of future plans) that are strongly marked by intrinsic requirements to perform to perfection. Hence, for educational commitments, GPA works as a positive catalyst when it channels a strong orientation toward aiming for becoming the very best. Finally, the fact that strong educational commitments acted as a booster for academic achievement corroborated with existing evidence on the motivational value of this identity process in educational contexts (e.g., Negru-Subtirica & Pop, 2018; Negru-Subtirica et al., 2017).

Educational In-Depth Exploration: A Double-Edged Process

For educational in-depth exploration, the results highlighted an intriguing chain of associations (for a schematization, see Figure 3). Self-oriented perfectionism mediated the positive relation between academic achievement and exploration. In addition, a unidirectional positive direct link from educational in-depth exploration to socially prescribed perfectionism was found. These two results highlight the dual nature of in-depth exploration, as it feeds from high academic achievement through excessively high self-set performance standards, on the one hand, but it also stimulates increasing perceptions that other people expect perfection of oneself.

The domain of education is viewed as a normative, relatively "closed" domain, in that it offers adolescents limited, school-system guided chances to explore their existing educational commitments (Albarello et al., 2018; Negru-Subtirica, Pop, et al., 2018; Negru-Subtirica & Pop, 2018). On the one hand, in-depth exploration of existing educational commitments represents a way to verify to what extent existing commitments provide a good fit with own's talents and aspirations. On the other hand, it may be seen as a sign of personal indecisiveness, especially in educational contexts that impose linear advancements in a chosen academic track (Negru-Subtirica & Damian, 2018). Once adolescents make an educational commitment (e.g., choose a certain academic track), further in-depth exploration of this commitment may be fueled by excessive, often unrealistic self-set performance expectations. In the current study, adolescents with high levels of academic achievement set excessively high performance expectations for themselves and, in turn, tended to engage in more educational in-depth exploration across time to find additional validation of these internal expectations. Moreover, educational in-depth exploration fostered socially prescribed perfectionism longitudinally, meaning that adolescents who explored more increasingly their current commitments tended to consider that others (e.g., teachers, classmates, parents) expect them to be perfect. This finding can be interpreted

considering that in-depth exploration encompasses a strong focus on social comparison (Crocetti et al., 2018). Thus, when adolescents discuss intensively with other people about their educational choices they might become more prone to internalize others' opinions and expectations In adolescents, socially prescribed perfectionism has been shown to be highly influenced by parents' expectations (e.g., Damian et al., 2013) and behaviors (e.g., Damian et al., 2021). At a developmental time when social evaluation plays an important role, it comes as no surprise that emphasizing other people's opinions about oneself might drive increases in adolescents' socially prescribed perfectionism.

Thus, these findings provide further evidence on the double-edged nature of in-depth exploration that has been well-documented in the literature. In-depth exploration is related to positive psycho-social aspects, such as openness to experience, agency in searching self-relevant information, and social responsibility (e.g., Crocetti et al., 2012; Raiziene et al., 2022). However, it might lead also to indecisiveness about oneself and it is related to signs of distress, such as anxiety symptoms (e.g., Crocetti, Hale et al., 2015).

Educational Reconsideration of Commitment: Academic Achievement and External Pressures to Be Perfect

As for educational reconsideration of commitment, some key direct effects were detected (for a schematization, see Figure 4). In terms of direct links between academic achievement and educational identity, higher GPA led to decreases in educational reconsideration of commitment. Hence, higher GPA was a protective factor from reconsideration of educational commitment, possibly working as a confirmation of adolescents' success in this life domain and reducing their need to look for alternative educational options. This finding is in line with existing longitudinal evidence (Pop et al., 2016). Also noteworthy is that socially prescribed perfectionism predicted

increases in educational reconsideration of commitment and decreases in academic achievement across time. Thus, perceived excessive performance expectations from others reinforce reconsideration of commitment in two ways. One way is by socially prescribed perfectionism directly hampering academic achievement across time (which also directly affects reconsideration of commitment), possibly due to its links to a range of psychological maladjustment indicators such as negative affect (Damian et al., 2014) and anxiety symptoms (Damian, Negru-Subtirica, et al., 2017). Another way is by directly increasing reconsideration of educational commitments, meaning that adolescents who believe that others expect perfection of them start doubting whether their chosen educational paths are the right ones. A possible explanation for this may reside in the external locus of control and motivation that characterizes socially prescribed perfectionism. As shown by Hewitt and Flett (2002), adolescents with high levels of socially prescribed perfectionism may feel like pawns who are not in control of their lives and also may lack a sense of identity. Being certain of one's choices when one believes that other people hold control over one's life seems to be a difficult endeavor for adolescents.

Practical Implications

The results of this study have important practical implications. They shed new light on the educational identity-academic achievement relation by highlighting the role played by the personality disposition of perfectionism. Notably, while self-oriented perfectionism was found to be implicated in the association between academic achievement and processes underpinning consolidation of educational identity (i.e., commitment and in-depth exploration; Crocetti, 2017), socially prescribed perfectionism was related to identity uncertainty (i.e., high reconsideration of commitment). Taken together, these results suggest the differential role of self-oriented and socially prescribed perfectionism. Building upon this evidence, school counselors, teachers, and families could help adolescents in differentiating motives that are driven internally, by the desire

to excel and succeed in important life domains (e.g., education), from those that are driven externally, by the (perceived) pressure to comply with standards imposed by significant others.

Limitations and Directions for Future Research

The present study has a number of limitations. First, this study looked at academic achievement from a general perspective (i.e., GPA), which is a valid indicator of how well adolescents do in school. Nevertheless, future studies could investigate how subject-specific grades (i.e., sciences, arts and languages) are longitudinally linked to educational identity processes, as a recent meta-analysis (Möller et al., 2020) has underscored the importance of appraising both general and subject-specific academic achievement in relation to self-concept in school. Second, the present findings may be limited to the particular time span (two academic years) taken into account. Future studies may therefore investigate if the present findings generalize to other time spans as some effects could unfold over shorter or longer time (cf. Dormann & Griffin, 2015).

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Conclusion

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Present-day social contexts increasingly stress the importance of being and becoming the absolute best version of oneself. One such social context is the educational one, with the longitudinal link between educational identity and academic achievement being enforced by adolescents' perfectionism, through self- or other-set excessively high performance goals and expectations. This four-wave study showed a complex longitudinal reinforcement loop of educational commitments in adolescence, with this identity process being both an outcome of academic achievement through the mediation of self-oriented perfectionism and a mediator of the self-oriented perfectionism – academic achievement relation. This study also underscored the dual nature of educational in-depth exploration, which fosters a maladaptive focus on unrealistically high performance expectations set by others, but it also feeds from high academic

achievement through self-oriented perfectionism. Educational reconsideration of commitment is a highly taxing identity process, as it is strengthened by low academic achievement and high socially prescribed perfectionism. In a global context where many societies stress the paramount role of education in preparing the very best students, these results stress the intricate and possibly sabotaging links between educational identity processes, academic achievement, and perfectionism.

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References

Albarello, F., Crocetti, E., & Rubini, M. (2018). I and us: A longitudinal study on the interplay of personal and social identity in adolescence. *Journal of Youth and Adolescence, 47*, 689-702. https://doi.org/10.1007/s10964-017-0791-4

Baird, L. L. (1976). Using self-reports to predict student performance. *College Entrance Examination Research Monograph, 7*, 1-17.

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

Byrne, B.M. (2012). *Structural equation modeling with Mplus* (2nd ed.). Routledge.

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. https://doi.org/10.1080/10705510701301834

Chen, F., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociological Methods & Research*, *36*(4), 462-494. https://doi.org/10.1177/0049124108314720

Credé, M., & Kuncel, N.R. (2013). Self-reported grades and GPA. In J. Hattie, & E.M. Anderman (Eds.), *International guide to student achievement* (pp. 49–50). New York: Routledge.

Crocetti, E. (2017). Identity formation in adolescence: The dynamic of forming and consolidating identity commitments. *Child Development Perspectives, 11*(2), 145-150. https://doi.org/10.1111/cdep.12226

Crocetti, E. (2018). Identity dynamics in adolescence: Processes, antecedents, and consequences. *European Journal of Developmental Psychology, 15*(1), 11-23. https://doi.org/10.1080/17405629.2017.1405578

Crocetti, E., Branje, S., Rubini, M., Koot, H., & Meeus, W. (2017). Identity processes and

parent-child and sibling relationships in adolescence: A five-wave multi-informant

longitudinal study. *Child Development, 88*(1), 210–228.

https://doi.org/10.1111/cdev.12547

Crocetti, E., Cieciuch, J., Gao, C. H., Klimstra, T., …., & Meeus, W. (2015). National and

gender measurement invariance of the Utrecht-Management of Identity Commitments

Scale (U-MICS): A ten-nation study. *Assessment, 22*(6), 753-768.

https://doi.org/10.1177/1073191115584969

Crocetti, E., Hale, W. W. III, Dimitrova, R., Abubakar, A., Gao, C. H., & Pesigan, I. J. A.

(2015). Generalized anxiety symptoms and identity processes in cross-cultural samples of

adolescents from the general population. *Child & Youth Care Forum, 44*, 159-174.

https://doi.org/10.1007/s10566-014-9275-9

Crocetti, E., Jahromi, P., & Meeus, W. (2012). Identity and civic engagement in

adolescence. *Journal of Adolescence, 35*, 521-532.

https://doi.org/10.1016/j.adolescence.2011.08.003

Crocetti, E., Prati, F., & Rubini, M. (2018). The interplay of personal and social identity.

European Psychologist, 23(4), 300–310. https://doi.org/10.1027/1016-9040/a000336

Damian, L.E., Negru-Subtirica, O., Stoeber, J., & Băban, A. (2017). Perfectionistic concerns

predict increases in adolescents' anxiety symptoms: A three-wave longitudinal study. *Anxiety,*

Stress, & Coping, 30(5), 551-561. https://doi.org/ 10.1080/10615806.2016.1271877

Damian, L.E., Stoeber, J., Negru, O., & Băban, A. (2013). On the development of perfectionism

in adolescence: Perceived parental expectations predict longitudinal increases in socially

prescribed perfectionism. *Personality and Individual Differences, 55*(6), 688-693.

https://doi.org/10.1016/j.paid.2013.05.021

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), 1-16.

Damian, L. E., Stoeber, J., Negru-Subtirica, O., & Băban, A. (2017). On the development of perfectionism: The longitudinal role of academic achievement and academic efficacy. *Journal of Personality, 85*(4), 565-577. https://doi.org/10.1111/jopy.12261

Damian, L. E., Negru-Subtirica, O., Pop, E. I., & Stoeber, J. (2021). Becoming a perfectionistic adolescent: Perceived parental behaviors involved in developmental trajectories of perfectionism. *European Journal of Personality*. https://doi.org/10.1177/08902070211012902

Dormann, C., & Griffin, M. A. (2015). Optimal time lags in panel studies. *Psychological Methods, 20*(4), 489-505. https://doi.org/10.1037/met0000041

Endleman, S., Brittain, H., & Vaillancourt, T. (2021). The longitudinal associations between perfectionism and academic achievement across adolescence. *International Journal of Behavioral Development*, *46*(2), 91-100. https://doi.org/10.1177/01650254211037400.

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*(7), 634-652. https://doi.org/ 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: APA.

Hatano, K., Sugimura, K., & Klimstra, T. A. (2017). Which came first, personality traits or

identity processes during early and middle adolescence? *Journal of Research in Personality*, *67*, 120-131. https://doi.org/ 10.1016/j.jrp.2016.06.014

Hewitt, P. L., & Flett, G. L. (2002). Perfectionism and stress processes in psychopathology. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (p. 255-284). American Psychological Association. https://doi.org/10.1037/10458-011

Hewitt, P. L., Flett, G. L., & Mikail, S. F. (2017). *Perfectionism: A relational approach to conceptualization, assessment, and treatment*. New York: Guilford.

Karaś, D., Cieciuch, J., Negru, O., & Crocetti, E. (2015). Relationships between identity and well-being in Italian, Polish, and Romanian emerging adults. *Social Indicators Research, 121*(3), 727-743. https://doi.org/10.1007/s11205-014-0668-9

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*(404), 1198–1202. https://doi.org/10.1080/01621459.1988.10478722

Madigan, D. J. (2019). A meta-analysis of perfectionism and academic achievement. *Educational Psychology Review, 31*(4), 967–989. https://doi.org/10.1007/s10648-019-09484-2

Marsh, H. W., Pekrun, R., Murayama, K., Arens, A. K., Parker, P. D., Guo, J., & Dicke, T. (2018). An integrated model of academic self-concept development: Academic self-concept, grades, test scores, and tracking over 6 years. *Developmental Psychology, 54*(2), 263-280. https://doi.org/10.1037/dev0000393

Meens, E. E., Bakx, A. W., Klimstra, T. A., & Denissen, J. J. (2018). The association of identity and motivation with students' academic achievement in higher education. *Learning and Individual Differences, 64*, 54-70. https://doi.org/10.1016/j.lindif.2018.04.006

Meeus, W. (2016). Adolescent psychosocial development: A review of longitudinal models and

research. *Developmental Psychology, 52*(12), 1969-1993. https://doi.org/10.1037/dev0000243

Meeus, W. (2018). The identity status continuum revisited: A comparison of longitudinal

findings with Marcia's model and dual cycle models. *European Psychologist, 23*, 289–299.

https://doi.org/10.1027/1016-9040/a000339

Möller, J., Zitzmann, S., Helm, F., Machts, N., & Wolff, F. (2020). A meta-analysis of relations

between achievement and self-concept. *Review of Educational Research, 90*(3), 376-419.

https://doi.org/10.3102/0034654320919354

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.). Los Angeles: Author.

Negru-Subtirica, O., Pop, E. I., Damian, L. E., & Stoeber, J. (2021). The very best of me:

Longitudinal associations of perfectionism and identity processes in adolescence. *Child*

Development, 92(5), 1855-1871. https://doi.org/10.1111/cdev.13622.

Negru-Subtirica, O., Pop, E. I., Crocetti, E., & Meeus, W. (2020). Social comparison at school:

Can GPA and personality mutually influence each other across time? Journal of Personality,

88(3), 555-567. https://doi.org/10.1111/jopy.12510

Negru-Subtirica, O., & Pop, E. I. (2018). Reciprocal associations between educational identity

and vocational identity in adolescence: A three-wave longitudinal investigation. *Journal of*

Youth and Adolescence, *47*(4), 703-716. https://doi.org/10.1007/s10964-017-0789-y

Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2017). A longitudinal integration of identity styles

and educational identity processes in adolescence. *Developmental Psychology*, *53*(11), 2127-

2138. https://doi.org/10.1037/dev0000325

Negru-Subtirica, O., Pop, E. I., & Crocetti, E. (2018). Good omens? The intricate relations

between educational and vocational identity in adolescence. *European Journal of*

Developmental Psychology, 15(1)*,* 83-98. https://doi.org/10.1080/17405629.2017.1313160

Negru-Subtirica, O., & Damian, L. E. (2018). The great escape: Linking youth identity
     development to growing up in post-communist Romania. In: Lebedeva N., Dimitrova R., &
     Berry J. (Eds), *Changing values and identities in the post-communist world. Societies and
     political orders in transition* (pp. 333-347). Springer International Publishing, Cham:
     Switzerland. https://doi.org/ 10.1007/978-3-319-72616-8_19

Piotrowski, K. (2019). Perfectionism and identity processes in two domains: Mediational roles of
     worry, rumination, indecisiveness, shame, and guilt. *Frontiers in Psychology*, *10*, 1864.
     https://doi.org/ 10.3389/fpsyg.2019.01864

Pop, E. I., Negru-Subtirica, O., Crocetti, E., Opre, A., & Meeus, W. (2016). On the interplay
     between academic achievement and educational identity: A longitudinal study. *Journal of
     Adolescence, 47*, 135-144. https://doi.org/10.1016/j.adolescence.2015.11.004

Raiziene, S., Erentaite, R., Pakalniskiene, V., Grigutyte, N., & Crocetti, E. (2022). Identity
     formation patterns and online activities in adolescence. *Identity*,
     https://doi.org/10.1080/15283488.2021.1960839

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* (pp.
     399-419). Sage.

Stoeber, J., Edbrooke-Childs, J. H., & Damian, L. E. (2018). Perfectionism. In R. J. R. Levesque
     (Ed.), *Encyclopedia of adolescence* (Vol. 4, pp. 2732-2739). New York: Springer.

Table 1

Reliabilities, Descriptive Statistics, and Correlations between Educational Identity, Academic Achievement, and Perfectionism

| | Reliabilities | Descriptives | Perfectionism | | | | | | | | Academic achievement | | | |
| | | | Self-oriented perfectionism | | | | Socially prescribed perfectionism | | | | GPA | | | |
	α	M (SD)	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
Identity processes														
Commiment T1	.91	3.78 (0.92)	.27***	.25***	.32***	.21***	.04	-.00	.04	.05	.15**	.13**	.18**	.13*
Commiment T2	.93	3.75 (0.92)	.24***	.33***	.29***	.20***	.02	.03	-.03	-.05	.16**	.12*	.18**	.13*
Commiment T3	.93	3.80 (0.93)	.18***	.28***	.33***	.19***	.05	.08	.03	-.01	.10	.06	.07	.13*
Commiment T4	.92	3.72 (0.92)	.16***	.16***	.19***	.23***	-.02	-.07	-.08	-.05	.13*	.11	.14*	.21***
In-depth exploration T1	.81	3.00 (0.87)	.32***	.27***	.28***	.21***	.29***	.24***	.26***	.23***	.03	.08	.07	.09
In-depth exploration T2	.81	3.02 (0.85)	.21***	.32***	.34***	.21***	.12***	.23***	.22***	.18***	.05	-.02	.04	.02
In-depth exploration T3	.82	3.05 (0.88)	.14***	.24***	.36***	.22***	.12*	.24***	.26***	.17***	-.03	-.07	-.03	-.04
In-depth exploration T4	.79	3.09 (0.82)	.17***	.19***	.32***	.31***	.04	.15***	.21***	.21***	.05	.03	.06	.08
Reconsideration of commitment T1	.85	2.20 (1.06)	.07	.07	.07	.09	.29***	.22***	.23***	.31***	-.07	.03	-.12*	-.02
Reconsideration of commitment T2	.86	2.26 (1.06)	.06	.11**	.08	.03	.20***	.26***	.24***	.30***	-.17***	-.16***	-.05	-.14*

	α	M (SD)												
Reconsideration of commitment T3	.84	2.34 (1.09)	-.03	.02	.05	.01	.13***	.16***	.25***	.18***	-.07	-.14*	-.19***	-.16**
Reconsideration of commitment T4	.84	2.51 (1.09)	-.02	.05	.14***	.08	.17***	.21***	.29***	.29***	-.16**	-.22***	-.19***	-.18***
Academic achievement														
GPA T1	-	8.99 (0.84)	.26***	.23***	.19***	.25***	.01	-.03	.06	.01	-	-	-	-
GPA T2	-	8.97 (0.73)	.25***	.24***	.15**	.25***	-.05	-.06	-.02	-.02	-	-	-	-
GPA T3	-	8.98 (0.78)	.25***	.21***	.11*	.16**	-.05	-.05	-.07	-.04	-	-	-	-
GPA T4	-	9.00 (0.84)	.20***	.22***	.09	.19***	-.03	-.03	-.07	-.01	-	-	-	-
α			.76	.80	.79	.77	.84	.83	.83	.83	-	-	-	-
M (SD)			3.22 (0.60)	3.13 (0.61)	3.16 (0.61)	3.16 (0.57)	2.73 (0.75)	2.65 (0.70)	2.73 (0.72)	2.79 (0.70)	-	-	-	-

Note. T1 = Time 1, T2 = Time 2, T3 = Time 3, T4 = Time 4; α = Cronbach's Alpha; M = Mean; SD = Standard Deviation; *p < .05, **p < .01, ***p < .001.

Table 2

Cross-Lagged Models: Model Fit Indices and Model Comparisons

Models	Model fit indices						Model comparison					
	χ_{SB}^2	*df*	CFI	TLI	SRMR	RMSEA [90% CI]	Models	$\Delta\chi_{SB}^2$	Δdf	*p*	ΔCFI	ΔRMSEA
M1: Baseline model	201.519	114	0.981	0.956	0.033	.032 [.025-.039]						
M2a: Model with time invariance of stability paths	282.674	132	0.967	0.934	0.055	.039 [.033-.045]	M2-M1	65.720	18	0.000	-.014	.007
M2b: Model with partial time invariance of stability paths (coefficients of GPA T3-T4, SPP T1-T2, and COM T1-T2 were free to vary)	250.811	129	0.973	0.945	0.043	0.036 [.029-.042]	M2b-M1	43.368	15	0.000	-.008	.004
M3: Model with partial time invariance of stability paths and full time invariance of cross-lagged paths	309.165	173	0.970	0.954	0.050	.033 [.027-.038]	M3-M2b	59.088	44	0.064	-.003	-.003
M4: Model with partial time invariance	330.155	195	0.970	0.960	0.054	.031	M4-M3	20.585	22	0.547	.000	-.002

of stability paths, and full time [.025-

invariance of cross-lagged paths, and .036]

T2-T3 and T3-T4 correlations

	χ²	df	CFI	TLI	SRMR	RMSEA		Δχ²SB	Δdf		Δ	
M5: Model with partial time invariance	363.059	213	0.967	0.956	0.056	.031 [.025-.036]	M5-M4	32.280	18	.024	-.003	.000

of stability paths, and full time

invariance of cross-lagged paths, T2–

T3 correlations, and covariate effects

(i.e., age)

Note. χ² = Chi-Square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis index; SRMR = Standardized Root Mean Square Residual;

RMSEA = Root Mean Square Error of Approximation and 90% Confidence Interval; Δ = change in parameter. Δχ²SB model comparisons are based on Satorra

and Bentler's (1994) scaled difference chi-square test statistic; GPA = grade point average; SPP = socially prescribed perfectionism; COM = commitment.

Table 3

Results of the Cross-Lagged Model

Stability paths	T1-T2	T2-T3	T3-T4	T1-T3	T2-T4	T1-T4
Self-oriented perfectionism	.55***	.51***	.50***	.15***	.13***	.16***
Socially prescribed perfectionism	.60***	.39***	.39***	.33***	.29***	.09*
Commitment	.49***	.30***	.30***	.26***	.25***	.14**
In-depth exploration	.37***	.33***	.35***	.20***	.19***	.15***
Reconsideration of commitment	.32***	.31***	.30***	.22***	.21***	.02
GPA	.87***	.81***	.52***	.06	.05	.33***
Within-time correlations	**T1**	**T2**	**T3**	**T4**		
COM ↔ SOP	.27***	.19***	.20***	.22***		
COM ↔ SPP	.04	.03	.03	.03		
COM ↔ GPA	.15**	.01	.01	.01		
EXP ↔ SOP	.33***	.20***	.21***	.25***		
EXP ↔ SPP	.30***	.14***	.15***	.16***		
EXP ↔ GPA	.02	−.03	−.03	−.03		
REC ↔ SOP	.08	.06	.06	.06		
REC ↔ SPP	.29***	.15***	.16***	.15***		
REC ↔ GPA	−.09	−.06	−.06	−.05		
SOP ↔ GPA	.21***	.08**	.08**	.07**		
SPP ↔ GPA	−.04	.04	.03	.03		
Covariate effects	**T1 → T2**	**T1 → T3**	**T1 → T4**			
Age-group → SOP	.06*	.06*	.06*			
Age-group → SPP	.05*	.05*	.04*			
Age-group → COM	−.01	−.01	−.01			
Age-group → EXP	.02	.02	.02			
Age-group → REC	.00	.00	.00			

Age-group → GPA	.00	.00	.00	
Cross-lagged paths	T1 → T2	T2 → T3	T3 → T4	
COM → SOP	.03	.03	.03	
COM → SPP	−.05	−.05	−.05	
COM → GPA	.06***	.06***	.05***	
EXP → SOP	.05	.04	.05	
EXP → SPP	.07*	.06*	.06*	
EXP → GPA	−.00	−.00	−.00	
REC → SOP	.02	.02	.02	
REC → SPP	.04	.04	.04	
REC → GPA	.03	.03	.03	
SOP → COM	.08*	.08*	.07*	
SOP → EXP	.08*	.08*	.08*	
SOP → REC	.01	.01	.01	
SOP → GPA	.01	.01	.01	
SPP → COM	−.05	−.04	−.04	
SPP → EXP	−.00	−.00	−.00	
SPP → REC	.07*	.06*	.06*	
SPP → GPA	−.04*	−.03*	−.03*	
GPA → COM	.06	.05	.05	
GPA → EXP	.00	.00	.00	
GPA → REC	−.13***	−.12***	−.12***	
GPA → SOP	.05**	.05**	.05**	
GPA → SPP	−.00	−.00	−.00	

Note. *N* = 744. COM = commitment, EXP = in-depth exploration, REC = reconsideration of commitment, SOP = self-oriented perfectionism, SPP = socially prescribed perfectionism, GPA = grade point average; *p* < .05, **p* < .01, ***p* < .001.
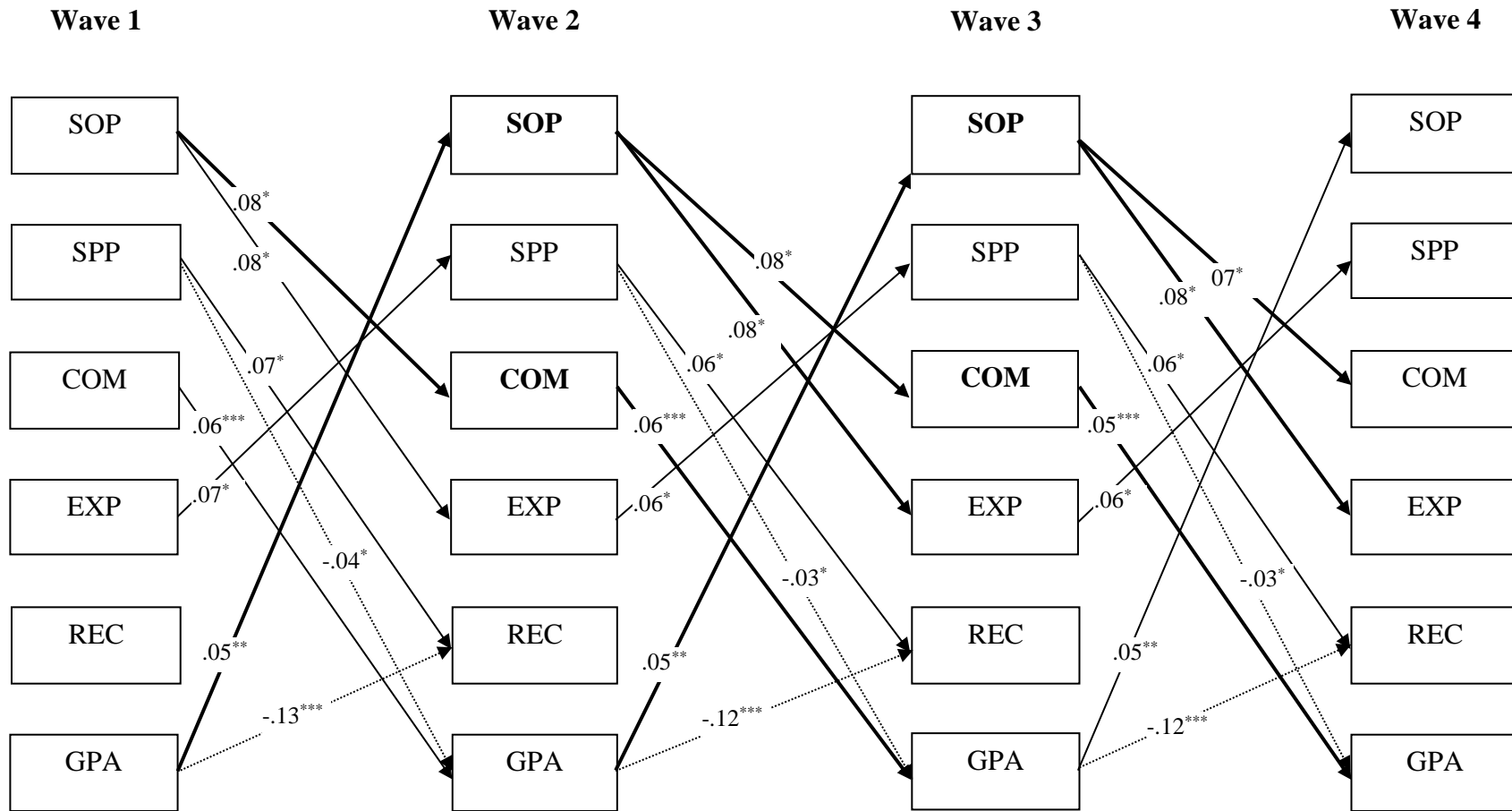
Figure 1. N = 744. Cross-lagged model between educational identity, academic achievement, and perfectionism (Model 5). To reduce model complexity, only significant longitudinal relations (*p* < .05) are shown. See Table 3 for all coefficients. Boldfaced constructs at Wave 2 and Wave 3 represent significant mediator variables whereas bolded arrows show the directions of indirect effects. Plain arrows represent positive effects and dotted arrows represent negative effects. SOP = self-oriented perfectionism, SPP = socially prescribed perfectionism, COM = commitment, EXP = in-depth exploration, REC = reconsideration of commitment; GPA = grade point average. *p* < .05, **p* < .01, ***p* < .001.
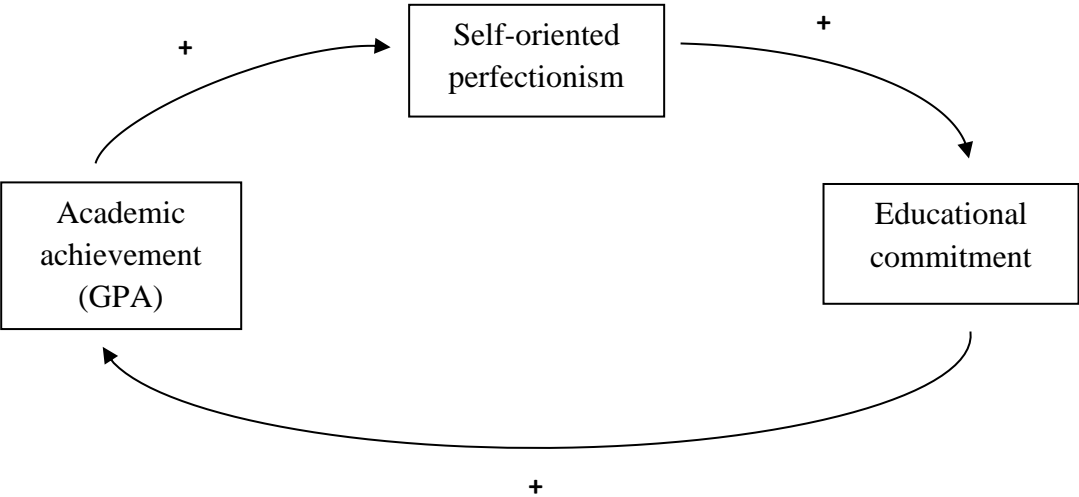
Figure 2. The positive loop underlying educational commitment
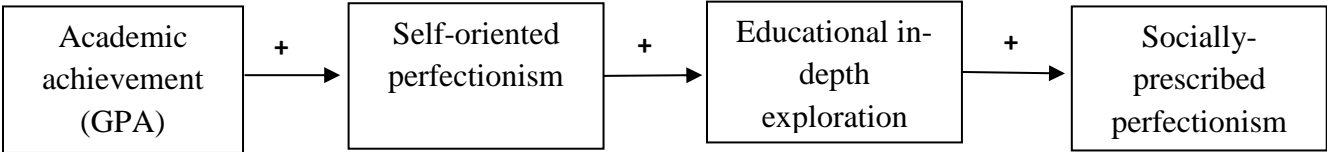

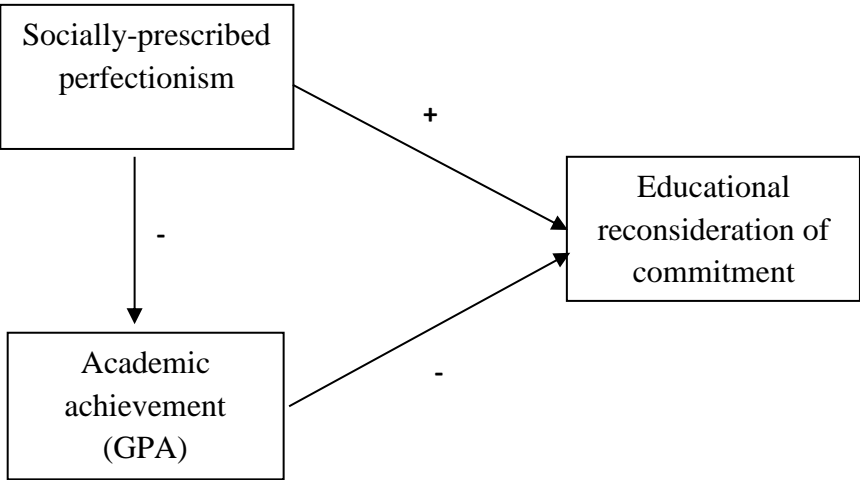*Figure 3*. The chain underpinning educational in-depth exploration

Figure 4. Risk factors for educational reconsideration of commitment