



Perfectionism as a predictor of academic achievement: a cross-sectional study on German university students

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Received: 19 February 2026 / Accepted: 21 September 2026
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Abstract

Perfectionism is highly prevalent among university students and may positively influence academic performance. This cross-sectional study investigated the relationship between multidimensional perfectionism – perfectionistic strivings (PS) and perfectionistic concerns (PC) – and academic achievement as well as successful aptitude test participation in a German university student sample ($N=284$; 55.6% military, 44.4% civilian students). Academic performance was assessed using GPA (1=very good, 5=insufficient), and successful aptitude test participation served as a binary indicator of pre-admission performance. Due to strong associations with perfectionism, conscientiousness was examined as a potential moderator, and task-approach goals as a potential mediator. PS was significantly associated with better academic performance ($r=-.25, p < .001$). Neither conscientiousness moderated, nor task-approach goals mediated this relationship. Students who had undergone aptitude testing reported descriptively higher levels of PS, although group differences were not statistically significant. These findings indicate that higher levels of PS were associated with better academic performance in the present sample. The results underscore the importance of perfectionism as a personality trait fostering performance-enhancing qualities in educational environments and occupational selection

Keywords Perfectionism · Perfectionistic strivings · Academic performance · Aptitude test

Introduction

Performance plays a crucial role in determining success, particularly in academic and professional contexts. To assess and differentiate individual capabilities, performance evaluations—such as academic grades and aptitude tests—are widely used. Understanding what contributes to differences in performance is therefore of high relevance. One psychological factor that may explain such differences is perfectionism, a personality trait characterized by striving for flawlessness and setting high personal standards. Recent research indicates that perfectionistic tendencies are highly

prevalent among university students, with over 90% showing at least moderate levels (Lin & Muenks, 2022).

Contemporary models distinguish between two facets of perfectionism: perfectionistic strivings (PS), often associated with positive outcomes, and perfectionistic concerns (PC), which are typically linked to maladaptive outcomes (Stoeber & Otto, 2006). Particularly, PS has been found to correlate positively with performance in academic, athletic, and cognitive domains (Stoeber, 2012; Stoeber & Kersting, 2007), suggesting that perfectionism may enhance performance. However, further research is needed to clarify whether perfectionism consistently benefits academic and vocational success, especially when assessed through objective indicators such as grade point average (GPA) and standardized aptitude tests.

This study aims to investigate the relationship between multidimensional perfectionism and academic performance, as well as successful aptitude test participation, in a sample of German university students. As aptitude testing is increasingly used in both university admissions and professional settings (Bausewein, 2016), understanding the psychological traits associated with success in these contexts is

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of growing importance. For instance, in high-stakes occupations such as remotely piloted aircraft operations in the U.S. Air Force, aptitude test performance strongly predicts occupational success (Barron et al., 2016). Furthermore, students admitted through aptitude testing tend to perform better in their studies than those who were not tested (Meyer et al., 2019). This study therefore also explores whether students who successfully passed an aptitude test as a requirement of their current program differ in their levels of perfectionism compared to those who did not.

Perfectionism

Perfectionism is widely recognized as a multidimensional personality trait and is characterized by critical self-evaluation, heightened sensitivity to mistakes, a strong desire to avoid errors, and the imposition of high performance standards (Frost et al., 1990; Hewitt & Flett, 1991).

Stoeber and Otto (2006) synthesized findings from multiple studies and proposed a two-factor structure that has since become a dominant framework in perfectionism research. This structure differentiates between *perfectionistic strivings* (PS) and *perfectionistic concerns* (PC). PS represents the self-directed pursuit of exceedingly high personal standards and striving for flawlessness (Gotwals et al., 2012). Gaudreau (2019) advocates for a clear distinction of striving for excellence and perfectionistic strivings to sharpen the understanding of the perfectionistic pursuit. The concepts differ in the difficulty and nature of goals and the intensity through which individuals strive towards their goals, specifically individuals with heightened PS strive beyond reaching excellence (Goulet-Pelletier et al., 2022). PC captures excessive self-criticism, fear of failure, and concerns about negative evaluation in social situations (Goulet-Pelletier et al., 2022). This conceptual distinction is illustrated in Fig. 1.

A growing body of research has linked PC to a range of maladaptive outcomes, including burnout (Stoeber & Rennert, 2008), rumination (Xie et al., 2019), and suicidal ideation (Limburg et al., 2017). In contrast, PS has been associated with adaptive characteristics such as goal-directed behavior, achievement motivation, and the pursuit of flawlessness (Gotwals et al., 2012). In line with literature and ambiguous findings regarding maladaptive outcomes, such as bulimic symptoms and psychopathology, PS is considered a double-edged sword (Goulet-Pelletier et al., 2022; Stoeber, 2014).

In a meta-analysis spanning 27 years, Curran and Hill (2019) found that levels of PS have increased over time among university students. This trend may reflect socio-cultural shifts toward competitiveness and individualism, resulting in heightened self-imposed standards and an intensified drive for perfection. The link between PS and academic achievement is well-documented: higher levels of PS have been shown to predict better exam performance and grade point average (GPA; Grugan et al., 2021; Loscalzo et al., 2019; Madigan, 2019).

Personality

Personality is commonly defined as a stable pattern of thoughts, feelings, and behaviors that differentiate individuals and remain consistent over time (Guilford, 1974). One of the most widely accepted models is the five-factor model (FFM), or “Big Five,” comprising Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Goldberg, 1990). Conscientiousness encompasses traits such as diligence, self-discipline, and achievement motivation and is linked to higher motivation, superior academic outcomes and perfectionistic strivings (Jensen, 2015; Smith et al., 2019).

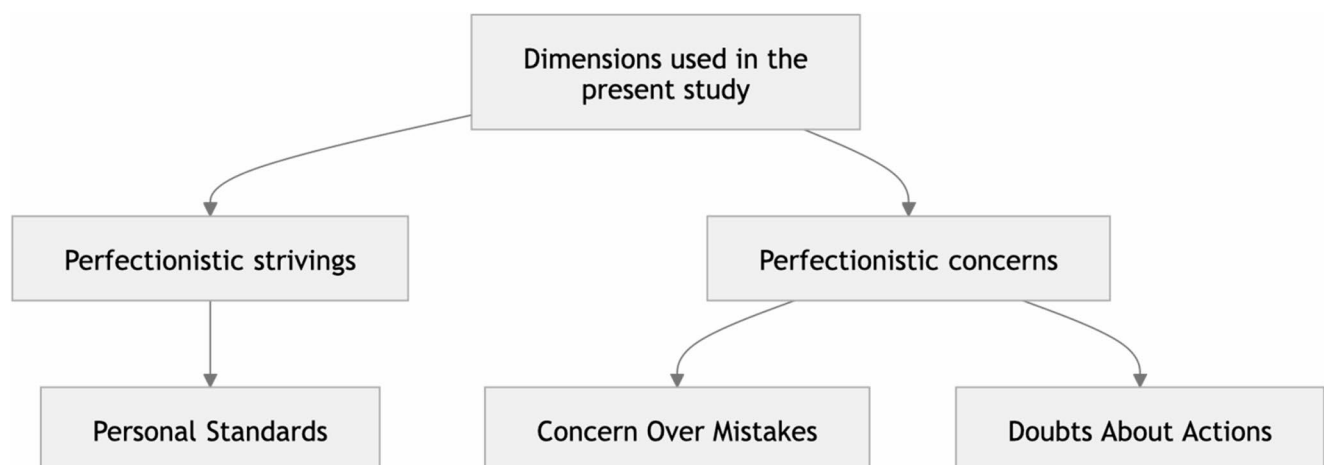


Fig. 1 Operationalization of perfectionistic strivings and perfectionistic concerns in the present study using selected subscales of the Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990)

Conscientiousness has also been found to predict performance and satisfaction in professional settings, contributing to an effective person-job fit (Tokar et al., 1998). In structured, high-responsibility environments such as the military, police, or emergency services, elevated levels of conscientiousness are particularly prevalent (Klee & Renner, 2013; McBride, 2018). Given these associations, conscientiousness may play a relevant role in understanding individual differences in academic performance and successful aptitude-test participation and may interact with perfectionistic tendencies in shaping outcomes.

Achievement goals and academic performance

Motivation is a key factor for success in high-performance environments such as academia, business, or sports (Brockbank et al., 2020). One of the most influential frameworks for understanding achievement-related motivation is achievement goal theory (Elliot et al., 2018). Achievement goals represent the underlying reasons that drive individuals to pursue success or avoid failure (Maehr, 1989).

The 3 × 2 achievement goal model distinguishes achievement goals according to two dimensions: goal definition and valence. Goal definition refers to task-based, self-based, or other-based standards, whereas valence differentiates between approach and avoidance orientations, resulting in six achievement goals (Elliot et al., 2011). The present study focuses specifically on task-approach goals, which concern attaining task-based competence, such as answering as many examination questions correctly as possible. Empirical evidence has shown that task-approach goals are associated with improved academic performance, enhanced learning behavior, and positive achievement-related emotions such as pride and enjoyment (Brondino et al., 2014; Mascaret et al., 2015).

Given their predictive power for performance and emotional well-being, task-approach goals are examined as a theoretically plausible explanatory variable in the relationship between perfectionistic strivings and academic performance.

Aptitude testing and occupational selection

Ensuring a match between individual capabilities and job requirements is a central goal of personnel selection—particularly in high-responsibility environments such as business leadership or the military (Sackett & Lievens, 2008).

The underlying logic of aptitude testing lies in identifying individuals whose profiles best match the psychological, cognitive, and interpersonal demands of a given role. This so-called person-job fit has been linked to better performance and job satisfaction (Klee & Renner, 2013; Tokar

et al., 1998). Personality traits such as conscientiousness, extraversion, and openness to experience have been shown to predict both leadership success and selection outcomes in such settings (Johnson & Hill, 2009; Shahzad et al., 2020).

The role of perfectionism in motivation, and aptitude performance

PS has been shown to positively predict academic achievement and aptitude test performance (Stoeber, 2012). In contrast, PC is generally unrelated or even negatively related to performance outcomes (Miller & Speirs Neumeister, 2017). In a comparative study, Stoeber and Kersting (2007) found that PS significantly predicted performance in reasoning and work sample tests, while conscientiousness-related achievement striving did not. This suggests that PS may play a distinct motivational role beyond general personality traits.

The motivational mechanism underlying these effects may be explained through achievement goal theory. Research indicates that PS is positively related to all types of approach goals (Stoeber et al., 2015). Specifically, task-approach goals have been identified as a mediator in the relationship between PS and academic performance (Barabadi & Khajavy, 2020; Stoeber et al., 2015). PS has also been associated with task-, self-, and other-based achievement goals, further highlighting its broad motivational impact in performance related contexts (Stoeber et al., 2015).

It can be assumed that perfectionistic strivings contribute to success in aptitude testing and occupational selection fostering approach-oriented motivational patterns—particularly task-approach goals. Stoeber and Kersting (2007) emphasized the need for further studies to examine these mechanisms explicitly. Accordingly, the present study aims to address this research gap by specifically implementing a theory-driven and mechanism focused design exploring the relationships between perfectionistic strivings, perfectionistic concerns, task-approach goals and conscientiousness as well as successful aptitude test participation and academic performance in a student sample (Stoeber et al., 2015; Stoeber & Kersting, 2007). Additionally, from a person-environment fit perspective, perfectionistic strivings may be particularly advantageous in contexts that strongly reward accuracy, persistence, and high achievement standards. Academic environments represent such contexts, potentially increasing the utility of perfectionistic tendencies for performance outcomes. More broadly, recent work has highlighted the importance of considering the alignment between individuals' characteristics and the functional demands or perceived utility of these characteristics within a given context, the self-utility distance (García-Arch et al., 2025). From this perspective, the potential benefits of perfectionistic strivings may depend not only

on the characteristics of the individual, but also on whether the demands and reward structure of the academic context make the pursuit of exceptionally high standards functionally advantageous. Importantly, the present study does not assess self-utility distance or directly test this framework; rather, we draw on this broader conceptual perspective to highlight the potential context dependence of the relationship between perfectionistic strivings and academic performance. The following hypotheses were derived:

H1 Students selected through aptitude testing will report significantly higher levels of perfectionistic strivings than students who were not selected through such testing.

H2 Students selected through aptitude testing will report significantly lower levels of perfectionistic concerns than students who were not selected through such testing.

H3 Perfectionistic strivings will be negatively associated with students' grade point average (i.e., higher PS will relate to better academic performance).

H4 The relationship between perfectionistic strivings and grade point average will be mediated by task-approach goals.

H5 The relationship between perfectionistic strivings and grade point average will be moderated by conscientiousness.

Methods

Participants

The sample for this study consisted of $N=284$ university students ($M_{age} = 23.11$ years, $SD=3.48$) with 152 participants identifying as male (53.5%) and 132 as female (46.5%). The inclusion criterion was current enrollment at a university at the time of data collection.

Participants were recruited from military and civilian universities in Germany. Military university students ($n=158$, 55.6%) were enrolled at institutions operated by the German Armed Forces, while civilian university students ($n=126$, 44.4%) represented various non-military academic institutions. The majority of participants were enrolled in undergraduate programs (89.5%, $n=254$), and nearly all held German citizenship (99.3%, $n=282$).

181 participants (63.7%) reported having successfully completed an aptitude test as part of their university admission process, including 100% of the military university students.

Socio-demographic information was collected via self-report including age, gender, nationality, current

matriculation status, university affiliation, completion of an aptitude test as a prerequisite for the current university program, highest level of education, field of study, and current grade point average (GPA).

Participation in the study was voluntary and anonymous. All participants provided informed consent. This research received approval by an Institutional Research Ethics Board of a University (Protocol #: EK M 24–36) and was conducted in accordance with the principles of ethical conduct in human subjects research.

Study design

This study employed a quantitative, cross-sectional design. Data was collected in 2024 via the SoSci Survey platform, hosted by a University. Participants were recruited through official university mailing lists, printed flyers, posters, and social media platforms (e.g., Instagram, WhatsApp, Facebook). Psychology students were offered 30 min of virtual participation credit (VPN time) as compensation, and all participants were eligible to enter a raffle for a €20 Amazon voucher.

The survey took approximately 15 min and all instruments were administered in validated German translations.

Measures

Personality

Personality traits were assessed using the German short version of the Big Five Inventory (BFI-K; Rammstedt & John, 2005). This instrument consists of 21 items measuring the five personality dimensions: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Responses were recorded on a 5-point Likert scale ranging from 1 (very inaccurate) to 5 (very accurate). Each subscale was represented by four items, except for Openness to Experience, which comprised five items.

In the present study, Cronbach's α values ranged from 0.58 to 0.83, with Cronbach's $\alpha=0.58$ for Conscientiousness. Compared to the representative German sample (Rammstedt & John, 2005), participants reported significantly higher levels of Conscientiousness ($t(673)=4.67$, $p < .0001$) and Agreeableness ($t(673)=4.33$, $p < .0001$), and significantly lower levels of Extraversion ($t(673)=5.72$, $p < .0001$) and Openness to Experience ($t(673)=6.03$, $p < .0001$).

Perfectionism

Perfectionism was assessed using one of the most widely used and theoretically established measures of multidimensional

perfectionism in the German version: the Frost Multidimensional Perfectionism Scale (FMPS-D; Stoeber, 1995). The scale includes 35 items covering six subscales: (1) Concern over Mistakes, (2) Parental Expectations, (3) Parental Criticism, (4) Doubts about Actions, (5) Personal Standards, and (6) Organization. Participants rated each item on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), indicating the extent to which each statement applied to them.

In line with the framework proposed by Stoeber and Otto (2006), perfectionistic strivings (PS) were operationalized using the Personal Standards subscale, whereas perfectionistic concerns (PC) were measured via the Concern over Mistakes and Doubts about Actions subscales. In the present study, internal consistency was good, with Cronbach's $\alpha=0.84$ for PS and $\alpha=0.88$ for PC.

Achievement goals

Achievement goals were measured using the German version of the 3×2 Achievement Goal Questionnaire (AGQ), based on the model by Elliot et al. (2011) and the adaptation by Langer (2012). The AGQ includes 18 items covering six goal orientations: task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance goals. Each subscale is represented by three items (sample item: "... to get a lot of questions right on the exams.").

Items were rated on a 7-point Likert scale ranging from 1 (not true of me) to 7 (extremely true of me). To match the academic context of the present study, minor wording adjustments were made. Specifically, the instructional phrase "in this class" was removed from the original items, and the introduction was modified to: "... for the previous exams within your studies." Internal consistency for the subscales was generally good to excellent, with Cronbach's α ranging from 0.83 to 0.93. The exception was task-avoidance goals, which showed lower internal consistency with Cronbach's $\alpha=0.63$.

Academic performance

Academic performance was assessed using students' self-reported Grade Point Average (GPA). In the German university grading system, GPA ranges from 1.0 (very good) to 5.0 (fail), with grades below 4.0 indicating insufficient performance and resulting in course failure. As a consequence, reported GPA values in this sample range from 1.0 to 4.0, where lower scores reflect better academic achievement.

Statistical analysis

The initial sample comprised $N=439$ participants. The data was cleaned according to predefined exclusion criteria:

incomplete responses, irregular response patterns, incorrect answers to the attention-check item, and implausibly fast completion times (i.e., < 240 s). The final sample consisted of $N=284$ valid cases.

Missing values on individual items were replaced using mean imputation (Göthlich, 2009). Composite scores (mean or sum) were calculated for all study variables. Perfectionistic strivings (PS) were operationalized via the Personal Standards subscale, and perfectionistic concerns (PC) via the subscales Concern over Mistakes and Doubts about Actions, in accordance with Stoeber et al. (2015).

Data analysis was conducted using IBM SPSS Statistics (Version 28). Assumptions for parametric testing, including normality and linearity, were examined and met. Due to substantial left skewness, the task-approach goals variable was reflected ($\text{Max} + 1 - x$) and natural log-transformed. Analyses were based on the transformed variable. Descriptive statistics were computed for all variables. To test H1 and H2 (group differences in PS and PC based on aptitude test status), independent samples t-tests were conducted. H3 (association between PS and GPA) was tested using Pearson's r , with 95% confidence intervals.

For H4 and H5, mediation and moderation analyses were performed using PROCESS macro for SPSS (Model 4 and Model 5; Hayes, 2017). Analyses were estimated with 5,000 bootstrap samples, 95% percentile bootstrap confidence intervals and heteroscedasticity-consistent standard errors. Mediation effects were considered significant if the confidence interval for the indirect effect did not include zero.

Results

Preliminary and descriptive findings

Descriptive statistics for perfectionistic strivings (PS), perfectionistic concerns (PC), task-approach goals, and conscientiousness are presented in Table 1.

Group differences based on aptitude testing

The independent samples t-test results for the comparison of perfectionistic strivings and perfectionistic concerns between students who had been selected through an aptitude test and those who had not, are presented in Table 2. No significant mean differences were found. These findings should be interpreted cautiously, as aptitude-test participation was not independent of institutional context in the present sample. Specifically, all military university students reported having completed an aptitude test as part of the admission process, which limits the interpretability of group comparisons based solely on aptitude-testing status.

Table 1 Descriptive data for perfectionistic strivings, perfectionistic concerns, conscientiousness, grade point average and task-approach goals among German university students

	<i>N</i>	Min	<i>M</i>	Max	<i>SD</i>	<i>SE</i>
PS	284	1.14	3.36	5.00	0.85	0.05
PC	284	1.00	2.78	4.72	0.76	0.05
Conscientiousness	284	2.00	3.75	4.50	0.37	0.02
Grade Point Average	283	1.00	2.19	3.70	0.57	0.03
Task-Approach Goals	274	1.67	6.39	7.00	0.88	0.05

N=number of participants, *Min*=minimum, *M*=mean value, *Max*=maximum, *SD*=standard deviation, *SE*=standard error

Table 2 Descriptive statistics of perfectionistic strivings and perfectionistic concerns in aptitude tested and not aptitude tested German University students

	<i>N</i>	<i>M</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>SD</i>	95% <i>CI</i>
Aptitude tested PS	181	3.42	1.50	282	0.14	0.82	[-0.05;0.36]
Not aptitude tested PS	103	3.26	1.50	282	0.14	0.91	[-0.05;0.36]
Aptitude tested PC	181	2.79	0.20	282	0.84	0.72	[-0.17;0.20]
Not aptitude tested PC	103	2.77	0.20	282	0.84	0.84	[-0.17;0.20]

N=number of participants, *p*=significance level, *Mean*=mean value, *SD*=standard deviation, *t*=t-value, *df*=degrees of freedom, 95%*CI*=confidence interval of the mean difference

Perfectionism and academic achievement

To test Hypothesis 3 (H3), a two-tailed Pearson correlation was calculated between perfectionistic strivings (PS) and grade point average (GPA). A significant negative correlation was found, indicating that higher PS was associated with better academic performance (as lower GPA reflects better grades in the German system). Correlation coefficients are presented in Table 3.

The mediation analysis revealed a significant overall model ($R^2 = .07$, $p < .001$). PS significantly predicted task-approach goals ($a = -.16$, $SE = .06$, $p = .008$). Task-approach goals did not significantly predict GPA ($b = .08$, $SE = .04$, $p = .057$). The direction of the *a*- and *b*-path effects is reversed due to the prior reflection and transformation of the mediator. The direct effect of PS on GPA remained significant when controlling for the mediator ($c' = -0.14$, $SE = 0.04$, $p < .001$). The indirect effect was not significant ($a*b = -0.013$, $SE = 0.009$, 95% bootstrap CI [-0.034;0.001], CI includes zero). These results provide no evidence of mediation by task-approach goals ($N=273$).

The moderation analysis (PROCESS Model 5) revealed a significant overall model ($R^2 = 0.064$, $F(3, 279)=5.95$, $p < .001$). However, the interaction term was not significant, indicating that conscientiousness did not moderate the effect of PS on GPA ($\Delta R^2 = 0.002$, $F(1, 279)=0.52$, $p = .47$, 95%CI [-0.33;0.15]). Mediation results are presented in Fig. 2.

Table 3 Correlation coefficients for the correlation between perfectionistic strivings and grade point average in German University students

	<i>r</i>	<i>p</i>	<i>CI</i> ₉₅
PS - GPA	-0.25**	<0.001	[-0.35 ; -0.14]

N=283. *r*=correlation coefficient, *p*=significance level, *CI*₉₅=confidence interval. ** $p < .001$

Discussion

The present study aimed to investigate the relationship between the personality trait perfectionism and academic performance, successful aptitude test selection, motivational factors and personality. As hypothesized, PS was significantly associated with academic performance, as indicated by a negative correlation with GPA ($r = -.25$, $p < .001$, 95% CI [-0.35, -0.14]), suggesting that students with higher levels of perfectionistic strivings perform better academically. These findings align with previous studies reporting small to medium positive relationships between PS and academic achievement ($r = .22$, Loscalzo et al., 2019; $r = .24$, Madigan et al., 2018). Furthermore, PS is known to correlate with higher self-esteem, subjective well-being, and life satisfaction (Fang & Liu, 2022; Madigan et al., 2018). Therefore, one possible explanation for the performance-enhancing effect of PS is its self-worth-regulatory function: individuals with high PS may derive their self-esteem primarily from performance outcomes (Burns, 1980; Hallsten et al., 2005). This mechanism is consistent with the concept of performance-based self-esteem, where striving for perfection becomes intrinsically rewarding (Gotwals et al., 2012).

In contrast, Endleman et al. (2022) argue that academic success leads to increased levels of perfectionism, based on the results of a longitudinal study. This suggests that the proposed mechanism may be reversed, with the outcome of performance shaping the trait-based nature of perfectionism, proposing a more reciprocal perspective. Although perfectionistic strivings were associated with better academic performance, this finding should not be interpreted as evidence that such tendencies are uniformly adaptive. Academic achievement represents only one aspect of functioning,

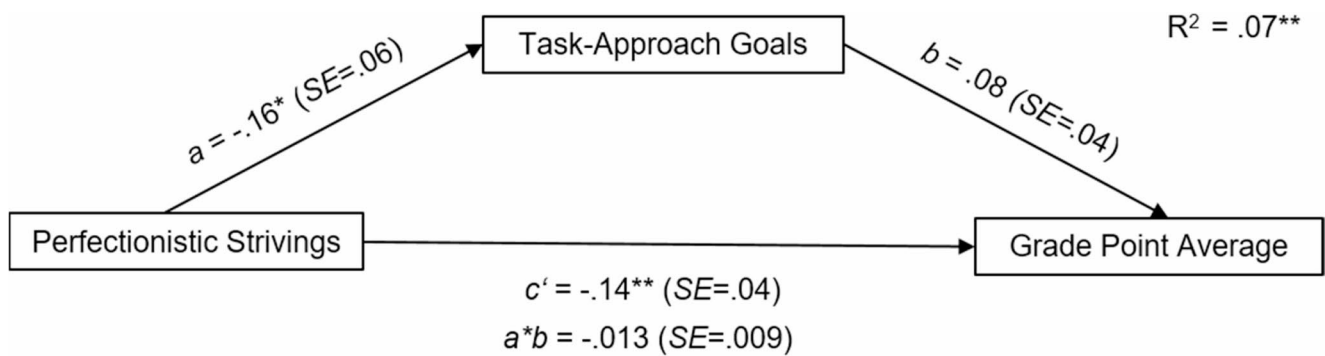


Fig. 2 Regression coefficients for the mediation analysis of task-approach goals in the relationship between perfectionistic strivings and grade point average in German university students. Note. $N = 273$.

a = effect of PS on task-approach goals; b = effect of task-approach goals on GPA; c' = direct effect; $a*b$ = indirect effect. $^{**} p < .001$. $^* p < .05$

and performance benefits may coexist with heightened self-imposed pressure, impaired recovery, or lower psychological well-being. Future studies should therefore examine achievement and well-being outcomes simultaneously to determine whether perfectionistic strivings support sustainable performance or whether academic success is achieved at the cost of psychological strain.

Contrary to expectations, task-approach goals did not mediate the relationship between PS and GPA. One possible explanation may be the mismatch between the trait-level GPA (accumulated academic outcome) and the state-based nature of task-approach goals, which typically reflect short-term exam-specific motivation. Similarly, conscientiousness did not moderate the effect of PS on academic performance. This supports earlier findings by Stoeber and Kersting (2007), who found PS, but not conscientiousness-related striving, to be a reliable predictor of test performance. Theoretical models suggest that PS and conscientiousness, while correlated, reflect distinct motivational and cognitive patterns (Hill et al., 2012).

Although students selected through aptitude tests showed descriptively higher PS levels, this difference was not statistically significant. Furthermore, the interpretation of these findings is complicated by the sample structure. Aptitude-test participation was closely linked to university affiliation, as all military university students had undergone aptitude testing. Consequently, observed group differences may partly reflect characteristics of different educational contexts rather than aptitude-testing status itself. Specifically, military university contexts, highly structured performance demands, selection procedures, and institutional norms may reinforce the expression and perceived utility of perfectionistic strivings. However, the present design does not allow these contextual influences to be separated from individual differences in perfectionism. Therefore, conclusions regarding the role of perfectionism in aptitude-testing outcomes should be regarded as tentative. Given the non-significant descriptive difference, further research is warranted. The

lack of group differences in perfectionistic concerns (PC) suggests that outcomes in aptitude testing procedures may not differentiate based on maladaptive perfectionism.

The heterogeneity of the sample, which included both civilian and military university students, may have further influenced the findings through individual differences. Particularly, military officer candidates undergo personality-shaping processes through training (Jackson et al., 2012). Accordingly, the reported personality differences (higher conscientiousness, higher agreeableness, lower openness, lower extraversion) between this study population and the representative German sample by Rammstedt and John (2005), may partly reflect the substantial proportion of military university students in the sample, as military training and selection processes are known to favor and reinforce traits such as conscientiousness and self-efficacy (Beke-siene, 2023). Especially the differences in conscientiousness may have influenced the reported levels of perfectionistic strivings and the overall GPA, due to its positive associations in the literature (Jensen, 2015; Smith et al., 2019).

Strengths, limitations, and future directions

The study contributes to a better understanding of perfectionism in performance-related contexts but is subject to several limitations. First, the cross-sectional design does not permit causal inferences.

Second, the successful participation of an aptitude tests as prerequisite of the current university program was assessed retrospectively; prospective data from selection contexts (e.g., at assessment centers) would increase ecological validity.

Another limitation concerns the comparison between aptitude-tested and non-tested students. Because aptitude-test participation was strongly associated with university affiliation in the present sample, aptitude-testing status cannot be considered independent of institutional context. As a result, the observed group comparisons may be confounded

by differences between military and civilian educational environments. Future research should investigate aptitude-testing effects in more homogeneous samples or employ multivariable models that simultaneously account for university affiliation and other contextual factors.

The dichotomous model of perfectionism (PS vs. PC) may oversimplify perfectionistic profiles. Mixed forms, as suggested by Lin and Muenks (2022), were not captured. Future studies should consider multidimensional models, such as the 2×2 model by Gaudreau and Thompson (2010) and should examine the self-regulatory conditions under which perfectionistic strivings are associated with beneficial rather than detrimental outcomes. Potentially relevant factors include flexible goal adjustment, recovery after demanding performance episodes, coping with failure, and the ability to disengage temporarily from achievement-related demands. Longitudinal and intensive repeated-measures designs could help clarify whether the consequences of perfectionistic strivings vary across performance and recovery phases and whether short-term achievement benefits are accompanied by longer-term psychological costs.

The selection of measurements for the construct of perfectionism was limited to validated German translations of the questionnaires. In line with this, the use of more recent instruments such as the Big Three Perfectionism Scale (BTPS; Smith et al., 2016), which includes self-worth contingencies, should be considered for English-speaking study populations. Furthermore, all constructs were assessed via self-report, which introduces the risk of socially desirable responding. Dropout patterns within the AGQ suggest potential problems with item acceptance or clarity, indicating the need for revised, context-sensitive achievement goal measures. The 3×2 AGQ appears well suited for capturing state-based performance goals but may be limited in predicting cumulative academic outcomes like GPA. In addition, while the GPA is a very distinct descriptive measurement of academic achievement, it is argued that multiple factors shape and influence the outcome of academic performance (e.g. self-efficiency, learning environments, academic problems; Moore, 2019). Furthermore, the present mediation model explained only a relatively small proportion of variance in academic performance ($R^2 = 0.07$), suggesting that additional cognitive, motivational, and contextual factors contribute substantially to academic achievement. In addition, the mediation analysis should be interpreted as exploratory and associational rather than as evidence for a causal mechanism linking perfectionistic strivings to academic performance. Future research should incorporate a more predictive approach with multiple variables related to academic achievement as well as process-oriented variables such as mental toughness or performance-based self-esteem to capture longer-term motivational dynamics.

The relatively low internal consistency of the conscientiousness scale ($\alpha = 0.58$) may have attenuated associations involving conscientiousness and contributed to the non-significant moderation effect.

Longitudinal designs as well as experimental designs within standardized personnel selection settings are recommended to capture within-person variability, causal relationships and clarify reciprocal effects. Field studies at assessment centers would provide more insights into how perfectionism unfolds in high-stakes contexts.

Conclusion

The present study provides evidence that perfectionistic strivings are associated with improved academic performance. The results underscore the potential of perfectionism as a multidimensional construct, for understanding individual differences in achievement-related contexts. Importantly, the results suggest that perfectionism is not merely a maladaptive trait but can also reflect adaptive, self-directed motivation. Future longitudinal studies should first examine whether perfectionistic strivings prospectively predict academic performance after accounting for conscientiousness, prior achievement, institutional context, and selection effects. They should additionally investigate whether potential performance advantages coexist with psychological strain or impaired recovery to better understand the dual role of perfectionistic strivings in success and failure.

Acknowledgements The authors thank the Mental Health and Physical Activity Research Centre at the University of Toronto for their support and inspiration.

Data availability The data that supports the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval This study was approved by the University of the Bundeswehr research ethics committee (Protocol #: EK UniBw M 24–36).

Informed consent Participants gave informed consent prior to participating in the study.

Consent to publish The authors affirm that human research participants provided informed consent for publication.

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

CRedit statement Yannick Rudolph: Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Visualization, Writing – original draft. Esther N. Moszeik: Supervision, Resources, Conceptualization, Writing – reviewing and editing.

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