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The interplay between subjective abilities and subjective demands and its relationship with academic success. An application of the person–environment fit theory

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Abstract In this study, we draw on person–environment fit theory to analyze whether academic success is best explained by individual abilities subjectively *exceeding* situational demands or by abilities *matching* the demands. Moreover, we disentangled effects of perceived abilities and subjective person–environment (P-E) fit on academic success. All in all, 693 teacher education students participated in an online questionnaire. Students were asked to rate general requirements of their academic programs (e.g., self-discipline) on a 5-point scale in terms of (1) their own abilities and (2) the perceived relevance for their studies. P-E fit was determined by difference scores between abilities and relevance ratings. Academic success was assessed by grades, perceived performance, and study satisfaction. Data were analyzed through structural equation modeling and suggest that academic success is best explained by a match between abilities and demands. Moreover, all three criteria for academic success were more strongly related to subjective fit than to subjective abilities.

Keywords Academic success · Person–environment fit theory · Demands–abilities fit · Higher education

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Student learning and student success are central for today's universities in fulfilling their educational mission (Larsen et al. 2013; Nelson et al. 2012; Severiens et al. 2015). Even if there are cases where dropout is inevitable (or even relieving for all parties involved), it always comes with certain costs (Jia and Maloney 2015). Therefore, analyzing and understanding academic success is crucial for lecturers, policymakers, and stakeholders alike: Gaining insight into its determining factors is not only important for individual counseling and tutoring but also for curriculum development, teacher education, and higher education policy.

Besides more traditional criteria (e.g., grades or self-perceived performance), study satisfaction is increasingly recognized as an important aspect of academic success (Camara 2005; Hell et al. 2008; Trapmann et al. 2007a). Current research has found several predictors of academic success, including general personal prerequisites, such as intelligence (Minnaert and Janssen 1998), high school grades (e.g., Jia and Maloney 2015; Trapmann et al. 2007b), personality (Trapmann et al. 2007a; Van Bragt et al. 2011; Zimmerman 2008), self-efficacy (e.g., Chemers et al. 2001), and the match between student and university (e.g., Georg 2008). From the universities' perspective—and therefore also from the perspective of higher education research—the latter is especially relevant because it does not only focus on individual but also on institutional characteristics, which can be changed by modifying study conditions. In fact, understanding the interplay between both factors allows tailoring study conditions to individual characteristics instead of using a one-size-fits-all solution that may not be sufficient for all students (Vermunt et al. 2014). Additionally, the interplay of individual characteristics and contextual factors is very important not only for predicting academic success but also for understanding and explaining learning as such (Dart 1994; Donche and Gijbels 2013; Kyndt et al. 2014; Richardson 2011; Vermunt and Endedijk 2011).

The present study investigates associations between academic success and the fit between academic demands and students' abilities. Person–environment fit (P-E fit) theory, originally developed in the context of industrial/organizational psychology (Edwards 1991), is a helpful theoretical foundation for such analyses. P-E fit theory is well-established in work contexts (e.g., Kristof-Brown et al. 2005). Due to the strong and growing similarities between work and academic contexts (Heise et al. 1997; Tynjälä 2008), the transfer of P-E fit theory mechanisms to the context of higher education appears promising. However, former studies using P-E fit theory in this context (e.g., Etzel and Nagy 2016; Li et al. 2013) have left many research questions open, especially because they did not use the full scope P-E fit theory provides with regard to higher education. The present paper tackles some of those research questions, allowing future higher education research to make use of this central, but underestimated, construct.

Types of person–environment fit

According to the P-E fit theory, a fit, that is, a congruence, match, similarity, or correspondence between personal factors (e.g., individual abilities) and situational factors (e.g., work requirements), leads to positive outcomes, such as satisfaction, performance, commitment, and well-being (Edwards et al. 2006; Edwards and Shipp 2007). This corresponds to the interactionist perspective in psychology, which assumes that behavior, attitudes, and well-being are influenced mutually by the person and the environment. Three different types of P-E fit are generally distinguished in organizational contexts (Cable and DeRue 2002): First, person–organization fit describes the match between an individual's values and the respective organizational culture. Second, needs–supplies fit pertains to the congruence between an individual's needs and the supplies the organization offers to fulfill these needs (e.g., training or pay). Third, demands–abilities fit is related to the skills and abilities of the individual and their correspondence regarding job requirements. Those three types of fit are interdependent. For example, needs–supplies fit is influenced by demands–abilities fit because high demands might entail a need for training (Edwards and Shipp 2007).

In higher education contexts, P-E fit research primarily focuses on so-called interest–major fit (e.g., Feldman et al. 2004; Schmitt et al. 2008; Tracey and Robbins 2006; Wessel et al. 2008), namely the fit between a student's interests and the subject he or she is studying. Even though demands and abilities are major topics in higher education research, investigations of the demand–abilities fit are relatively rare. Some notable exceptions can be found showing that demands–abilities fit predicts academic achievement (Etzel and Nagy 2016; Li et al. 2013) and study satisfaction (Heise et al. 1997). Even though those studies shed light on a crucial aspect of academic success, they leave important questions unanswered, as the next sections will show.

Assessing person–environment fit

Besides the distinction between different types of fit, researchers differentiate between objective and subjective P-E fit. Figure 1 describes both types of fit and their relationship. Objective P-E fit refers to the fit between objective personal factors and the objective environment with their actually existing attributes. In contrast to objective P-E fit, subjective P-E fit focuses on the fit between subjectively perceived personal and subjectively perceived situational factors (Edwards et al. 1998).

Subjective fit has been identified as a better predictor of positive outcomes compared to objective fit (Cable and DeRue 2002). As depicted in Fig. 1, the relationship between objective fit and several outcome variables (e.g., study satisfaction) is indirect, as the individual has to translate objective fit into subjective fit. For example, an individual might perceive the actual demands as rather high and his or her actual abilities as rather low. Hence, he or she will likely experience a misfit which, in turn, might reduce study satisfaction. As it is the individual's

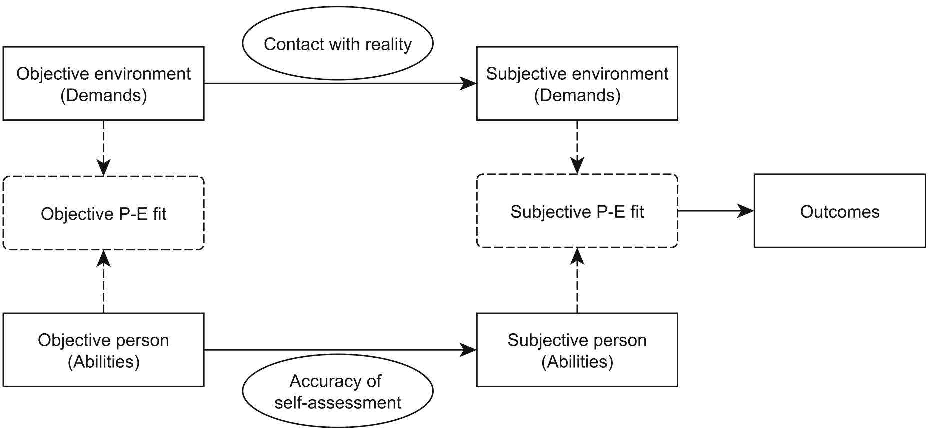

Fig. 1 A model describing the relationship between objective and subjective P-E fit. *Solid lines* indicate causal effects. *Dashed lines* indicate contributions to interaction effects. (Adapted from Edwards et al. 1998, p. 29; Harrison 1978, p. 176)

interpretation of actual fit, subjective P-E fit can significantly differ from objective P-E fit. As subjective P-E fit is directly connected to the outcomes (see Fig. 1), studies of P-E fit should focus on subjective P-E fit as the central predictor for such outcome variables (Edwards et al. 1998). This is also in line with the constructionist view, stating that the learners' interpretation of the learning environment is crucial for learning (Vermetten et al. 2002). Accordingly, studies on learning environments, demands, or P-E fit in higher education mostly consider the perceived environment (e.g., Nijhuis et al. 2008; Severiens et al. 2015), subjective demands (e.g., Nurttila et al. 2015), or subjective fit (e.g., Etzel and Nagy 2016).

Subjective P-E fit can be operationalized in two ways: The atomistic approach assesses personal and situational factors separately and combines them ex post to assess fit, whereas the molar approach directly assesses fit by asking to what extent the respondent's personal factors match the respective situational factors (Edwards et al. 2006). Referring to Fig. 1, the atomistic approach measures both solid boxes *subjective environment* and *subjective person*, and the molar approach solely measures the dashed box *subjective P-E fit*.[1]

The need to choose a specific combination rule may well be seen as a disadvantage of the atomistic approach. In fact, a great number of combinations of personal and situational factors are possible and plausible. Moreover, the suitability of different rules might vary depending on the personal and situational factors in question. One might therefore argue that the molar approach is more proximal and therefore better suited to assess fit. Nevertheless, when using the molar approach, respondents implicitly or explicitly use a rule to combine person and environment, too (Edwards 1991). As respondents might vary with regard to the rule they employ, a certain amount of uncontrollable—perhaps even systematic—variability emerges when using the molar approach. We therefore see it as necessary to carefully weigh the aforementioned arguments with regard to the specific research question when choosing either the molar or the atomistic approach.

Abilities exceeding or matching the demands

Insufficient abilities are associated with lower performance on a given task (Edwards and Shipp 2007; Muchinsky and Monahan 1987; Waldman and Spangler 1989). Intuitively, it therefore seems plausible that for positive effects on academic outcomes, individual abilities have to simply exceed situational demands. At first glance, excessively high abilities make a simple task even simpler, just like a high-performance computer can still effectuate basic calculations. Studies from the organizational context nevertheless suggest that this assumption is flawed (Edwards 1991). In fact, performance seems to increase when abilities increase toward demands, but excess abilities will likely result in boredom because the available abilities cannot be used (Edwards et al. 1998; Edwards and Shipp 2007; Reis and McCoach 2000). Therefore, we suggest that an *optimal* correspondence between abilities and demands might be more beneficial that abilities simply exceeding demands.

Analyzing the link between abilities and demands is not possible when using the molar approach (Edwards 1991). As this approach is widely used in higher education (e.g., Etzel and Nagy 2016; Li et al. 2013), no consensus has yet emerged on which understanding of fit would

[1] Please note that the terminology is sometimes heterogeneous in this regard. For example, the molar approach is sometimes also called perceived fit, and subjective fit is sometimes used to only mark the atomistic approach (e.g., Kristof-Brown et al. 2005; Wessel et al. 2008).

be the most appropriate. Therefore, we follow the argumentation and findings from the organizational context and expect an understanding of fit that defines the *optimal* level of fit as a match between abilities and demands to better predict academic success.

The confounding role of perceived abilities

A shortcoming of almost all fit measures is that they are confounded with perceived abilities because they comprise both fit and abilities (Edwards et al. 2006). Positive relationships between self-beliefs (e.g., self-concept or self-efficacy; Valentine et al. 2004) and academic success were shown in several meta-analyses (e.g., Richardson et al. 2012; Robbins et al. 2004; Valentine et al. 2004). Although a discussion of *why* self-beliefs influence academic success is beyond the scope of this paper, such findings are crucial to assessing P-E fit because self-beliefs (i.e., "general perceptions of academic capability" [Richardson et al. 2012, p. 356] or "self-evaluation of one's ability" [Robbins et al. 2004, p. 267]) are very similar to the perceived abilities construct in P-E fit theory. In fact, given the positive relationships between self-beliefs and academic success, it remains open as to what extent positive correlations between demands–abilities fit and academic success solely reflect effects of perceived abilities on academic success. We therefore see it as crucial to disentangle these effects by using the atomistic approach and to control for individual abilities.

Research questions

The present analysis was guided by the overarching goal to answer two basic questions left open by current research on P-E fit in higher education. First, existing research did not specify the relationship between person and environment in P-E fit, which leads to the first research question:

1. Which understanding of fit is relevant in terms of the atomistic approach? Do abilities and demands lead to higher academic success if the abilities exceed the demands or if the abilities equal the demands?

We assume that there is an *optimal* level of fit, which is why we expect the relationship between demands–abilities fit and academic success to be either V-shaped (absolute difference) or U-shaped (squared difference).

Second, as former findings on the relationship between demands–abilities fit and academic success might be confounded by perceived abilities, our second research question is:

2. Is there a relationship between academic success and subjective fit even if perceived abilities are controlled for?

Given prior findings on P-E fit theory in higher education (Etzel and Nagy 2016; Heise et al. 1997; Li et al. 2013), we expect positive relationships between subjective demands–abilities fit and performance (in terms of grades and self-rated performance), as well as a positive relationship between subjective demands–abilities fit and study satisfaction, even when controlling for perceived abilities.

Method

Sample and procedure

To investigate our research questions, an online questionnaire was sent to all students in teacher education programs in a medium-sized German university. In Germany, teacher education usually starts with a Bachelor's and Master's degree, typically scheduled for 6 years. After this academic phase, the preparatory service takes place in schools, accompanied by an institution outside the university. To enter a teacher education program, a general higher entrance qualification (Abitur) is needed.

In total, 1128 people opened the link to the questionnaire. Out of those, 693 students completed the instruments in question and were included in the analysis. Those students had a mean age of 23.69 years (SD = 3.94) and 562 (81.7%) were females. On average, they were in their 6.19th semester (SD = 3.83).

Measures

A summary of all measurement instruments including item examples is presented in Table 1. All instruments are adapted from the method of analyzing the demands of university studies (MEVAS, Hell et al. 2007). For abilities and demands, students were asked to rate general requirements of their academic programs (self-discipline, learning strategies, and academic activities) in terms of (1) their own ability and (2) the relevance each requirement has for their studies on a 5-point scale, ranging from 1 = *low ability/relevance* to 5 = *high ability/relevance*. Those general requirements were chosen because they cover a big range of different possible domains and represent common categorizations of learning theories (e.g., Vermunt and Verloop 1999): Self-discipline is related to affective learning, and both learning strategies and academic activities are connected to cognitive and regulative learning. Reliability analyses yielded good to very good values for Cronbach's alpha ($.81 \leq \alpha \leq .88$). Subjective P-E fit was determined by subtracting ability ratings from relevance (i.e., demand) ratings for each of the three requirements in the different ways described above. Given that difference scores are less reliable than their component scores, Cronbach's alpha was adjusted for the correlation between ability and demand ratings (Peter et al. 1993). As expected, reliability of the difference scores was lower but acceptable ($.58 \leq \alpha \leq .77$).

Academic success was operationalized in terms of self-reported study grades (ranging from 1 = *very good* to 5 = *insufficient*), perceived performance (four items, $\alpha = .66$), and study satisfaction (three items, $\alpha = .85$).

Statistical analyses

All calculations were done in R (version 3.0.2; R Core Team 2013). For structural equation modeling (SEM), the package lavaan (version 0.5-15; Rosseel 2012) was used (Estimator: ML; Kline 2011). Missing values were rather rare ($M = 7.2\%$; max = 11.1%). Still, to cope with missing data, the Full-Information Maximum Likelihood Method was applied (Graham 2009).

Research questions were examined through SEM. Figure 2 depicts the structural model used for the analyses. On the first-order level, one latent factor for each study requirement was modeled for abilities as well as for demands–abilities fit, resulting in six latent constructs. As the present study is an initial step in analyzing the relationship between fit, abilities, and

Table 1 Measurement instruments

Construct	*k*	Item example	α1	α2
Self-discipline	4	Accurate and careful execution	.87	.77
Learning strategies	4	Linking learning material with prior knowledge, previous experience and practical examples	.81	.60
Academic activities	4	Take time for study of literature	.83	.58
Study satisfaction	3	Overall, I'm satisfied in my present study	.85	–
Perceived performance	4	How would you evaluate yourself (compared to students, who are similarly far as you) ... regarding your performance in written tests?	.66	–
Grades	1	–	–	–

k number of items per scale, α1 Cronbach's alpha, α2 Cronbach's alpha for difference scores (adjusted according to Peter et al. 1993)

outcome variables, we were interested in general subjective abilities and general subjective fit (comparable to general self-efficacy; Scholz et al. 2002). In line with the idea that more general perceptions of abilities exert an influence across different behavioral domains (Bandura et al. 1980; Tipton and Worthington 1984), the three constructs for abilities and the three constructs for demands–abilities fit were combined on the second-order level, respectively. This means that we are interested in the shared variance of the three domains and not the unique variance of the specific factors, which allows for a more generalizing interpretation of the resulting fit variable. A positive side effect of this model specification is a much simpler and thus parsimonious model. The criteria for academic success were modeled as endogenous variables.

For demands–abilities fit, the difference scores between abilities and demands were computed on the manifest level in three different ways, each linked to a different understanding of what fit is (Edwards 1991, see Fig. 3). To answer the first research question, the three methods were subsequently compared. The first method used *algebraic differences* (i.e., simply subtracting the demands score from the abilities score), with the underlying assumption that the relationship between fit and outcome is linear. In other words, fit is understood as one factor exceeding the other factor.

The second and third methods of computing the difference scores were *absolute* and *squared differences*. Both are two (of many) possibilities to fulfill the assumption of an optimal level of fit. The use of an absolute difference (i.e., subtracting the demands score from the abilities score and erasing the algebraic sign) implies that the relationship between fit and outcome is inversely V-shaped, and fit is understood as a perfect correspondence between the abilities and demands. In this case, the fit score is a measure of the distance to the optimal level (i.e., the extent of misfit).

A similar understanding implies the use of a squared difference (i.e., subtracting the demands score from the abilities score and multiply it with itself), which also sees fit as a perfect congruence between both factors. The main difference between the absolute and the squared difference conception is the different impact of small and bigger extents of misfit. With an absolute difference conception, outcomes are more strongly affected by small extents of misfit compared to when using a squared difference. A squared difference conception, in contrast, might be more prone to produce biased results because extreme values are given more weight.[2]

[2] We thank an anonymous reviewer for his or her suggestion on this.

Fig. 2 Structural model for the analyses

Results

To examine the first research question, three different models, each indicating a different relationship between abilities, demands, and academic success, were estimated and compared in terms of their fit indices. The three models only differed in how the difference score for assessing fit was calculated (see above). Table 2 shows fit indices of the three models. Model 2 (absolute difference) yielded a good fit. To evaluate this model against the other models, the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) were used (Greven and Kneib 2010; Vrieze 2012). Both the AIC and the BIC were lowest for model 2 (absolute difference). With regard to research question 1, our data thus suggest that fit is best conceptualized as the absolute difference between demands and abilities. This implies that there is an optimal level of fit, and the relationship between fit and

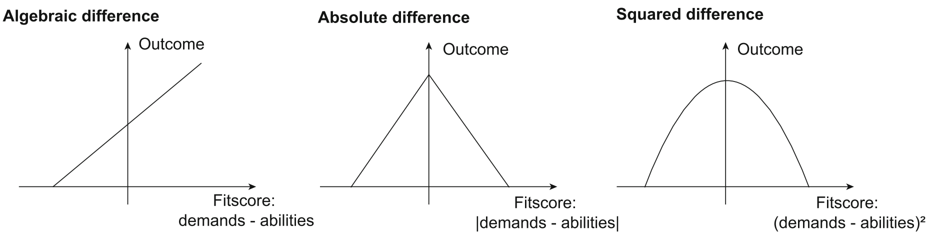

Fig. 3 Three possibilities to connect demands and abilities

academic success is inversely V-shaped. Therefore, this conceptualization of fit is also used for the following calculations.[3]

Research question 2 asks for the relationship between academic success and subjective fit while controlling for perceived abilities. Table 3 shows the latent correlations between the constructs.

In a first step, we estimated a model without the fit construct, which allows us—in a second step—to test the increment when adding the fit construct. Model fit was good, with $\chi^2(162) = 423.28$, CFI = .95, RMSEA = .05 (95% CI = .04–.05). The results are shown in Table 4. Even though the relationship between abilities and satisfaction is significant, the model without the fit construct explains only 4% of the total variance. In a second step, the model was estimated as described above (i.e., using the absolute difference between demands and abilities as fit indicator; see Fig. 3). Table 4 shows the resulting standardized model coefficients and the amount of explained variance for each outcome variable. Significant relationships were found between abilities and satisfaction; in addition, fit was significantly related to all of the three criteria for academic success. Explained variance ranged from 10 to 27%. With the relationship between fit and outcomes being significant in a model that also includes abilities, our expectations regarding research question 2 are supported.

Discussion

The present study examined relationships between subjective demands–abilities fit and academic success. Questionnaire data of 693 higher education students were analyzed using an SEM approach. The findings of this study substantially contribute to the understanding of the concept of P-E fit and its relevance in educational contexts. On a theoretical level, they add to previous research by not only concentrating on the main effects of personal (e.g., learning strategies) and situational factors but also by accounting for the interaction between both. With regard to practical implications, they indicate that higher education researchers, lecturers, and policymakers should focus even more on subjective demands–abilities fit. Moreover, they can be used to derive methods to increase student success and adjustment in higher education, as well as to refine and extend P-E fit theory with regard to higher education contexts.

With regard to research question 1, we expected fit to have an optimal level. This was supported because our data suggest a V-shaped relationship between fit and academic success, indicating that it is not sufficient when individual abilities simply *exceed* situational demands. Instead, they should *match* them. This is in line with findings on P-E fit theory from the organizational context, where reasons for such effects are found in motivational changes occurring when abilities exceed demands (e.g., negative effects of boredom; Edwards et al. 1998; Edwards and Shipp 2007).

Regarding research question 2, our design allows disentangling the effects of P-E fit and perceived abilities on academic success by including both variables in the model. Results suggest that all three criteria for academic success are better explained by subjective fit than by perceived abilities. This is in line with the results of former studies (Etzel and Nagy 2016; Li et al. 2013) and adds further value to this approach by controlling for perceived abilities. Interestingly, with subjective P-E fit in the model, perceived abilities were not associated with perceived performance and grades at all. This underlines the importance of considering

[3] Results were largely similar when using the U-shaped fit measure.

Table 2 Comparison of the different conceptions of fit

	Algebraic difference	Absolute difference	Squared difference
χ^2	2619.13 (449)	1006.39 (449)	1059.45 (449)
CFI	.78	.92	.92
RMSEA	.08	.04	.04
	90% CI = .08–.09	90% CI = .04–.05	90% CI = .04–.05
AIC	49,277.74	47,426.25	63,035.77
BIC	49,781.80	47,930.30	63,539.83

interactions between individual abilities and situational demands when predicting student success. Furthermore, our results indicate that subjective P-E fit explains a considerable amount of incremental variance over perceived abilities. The amount of explained variance by P-E fit was thereby relatively high (10–27%). In sum, this highlights the importance of P-E fit theory in higher education, and future research should definitely investigate whether these findings can be replicated.

Limitations and implications for future research

It is plausible that a number of limitations could have influenced the results obtained. First, all outcome measures were assessed using self-reports. Objective measures, such as grades or study pace (e.g., used by Lindblom-Ylänne et al. 2015), provided by the administration office, would add considerable value but could not be used in this study because of data privacy regulations (but see Kuncel et al. 2005, who meta-analytically found correlations of .90 between self-reported and actual grades in university students).

Second, even though our sample is relatively large, it comes with restrictions limiting the robustness of our results because it comprises only students of a teacher education program at one specific university. Moreover, there might be a bias in our participants' response behavior. First, with 82% female participants, we observed a slight overrepresentation of women in the sample (teacher education students typically consist of 70% females; e.g., Paderborn University 2012). Additionally, we notice that only 61% of the students who opened the link to our online questionnaire completed all the instruments in question. In the best case, reasons for this are random (e.g., a lack of time at that specific moment), so that the sample remains representative for the intended population. In the worst case, however, our study might have suffered from self-selection bias (e.g., only participants that wanted to have a voice in the study

Table 3 Latent correlations

	Subjective abilities	Fit	Perceived performance	Grades	Study satisfaction
Subjective abilities	1				
Fit[a]	.10	1			
Perceived Performance	.05	−.51*	1		
Grades	−.08	.30*	−.31*	1	
Study satisfaction	.22*	−.32*	−.48*	−.26	1

*$p < .05$

[a] Absolute difference: the higher the fit score, the higher the misfit

Table 4 Results of structural equation modeling: standardized regression coefficients

	Grades	Perceived performance	Study satisfaction
Step 1			
Subjective abilities	−.08	.04	.21*
R^2	.00	.01	.04
Step 2			
Subjective abilities	−.11	.10	.25*
Demands–abilities fit[a]	.31*	−.52*	−.35*
R^2	.10	.27	.17

*$p < .05$

[a] Absolute difference: the higher the fit score, the higher the misfit

filled out the whole questionnaire). All these aspects might be a threat to external validity, but with regard to transferability of findings, it should be noted that teacher education students, at least in Germany, form a rather heterogeneous group because they study a multitude of different subjects. Even though finding robust effects in such a heterogeneous group is a cause for optimism in itself, future research should investigate if the results are context-specific or not. Besides obvious factors, such as regional and institutional settings, relevant context factors might include study duration or student's amount of practical experience in a specific domain.

Finally, our study was only a first step toward a comprehensive understanding of P-E fit in higher education. Future investigations should have a more detailed look at research questions regarding (a) in-depth insights into the relationship between fit and outcomes, (b) the relationship between fit measured with the molar versus the atomistic approach, and (c) the content specificity of P-E fit.

Regarding the relationship between fit and outcomes, we concede that we only analyzed three basic cross-sectional models, which are not at all exhaustive. For example, we only assumed symmetric relationships between fit and outcomes. This simplification is instrumental for initial analyses, but asymmetric relationships might also be possible. Therefore, the symmetry and intercepts of fit curves should be analyzed in future research. To do so, researchers might use response surface methodology (RSM), where complex interactions can be modeled (Edwards 2007). Moreover, applying significance testing to our model comparisons is not feasible because they are not nested. Although we cannot choose between non-nested models by means of chi-square difference tests, AIC and BIC are commonly seen as valid alternatives to doing so (e.g., Greven and Kneib 2010; Vrieze 2012). Therefore, our comparison between the models (and thus between the three types of fit) is rather descriptive. Furthermore, since we employed a cross-sectional design, no causal interpretation is possible. We would expect P-E fit to influence academic success, but the possibility of reverse causality cannot be excluded.

The relationship between the atomistic and the molar approach should also be subject to future research. As outlined in the introduction, both operationalizations of fit have their pros and cons, and their integration might be helpful for understanding both. For example, one might investigate how they are related and which of the constructs explains more variance in what kind of outcomes. For our study, we chose the atomistic approach to analyze the different conceptions of fit and to systematically control for the effects of the subjective abilities. Future research might nevertheless tackle these questions, for example, by means of the RSM (Edwards 2007), with a fit indicator pertaining to the atomistic approach as an independent variable and fit assessed using the molar approach as a dependent variable.

Regarding content specificity, we did not concentrate on a specific domain or skill but drew on previous research focusing on fit in general. To do this, we selected three general requirements based on common categorizations of learning theories (e.g., Vermunt and Verloop 1999) in an effort to cover a wide range of requirements. To get the *essence* of P-E fit (i.e., different domains' shared variance), we combined these on the second-order level. Taking a more fine-grained perspective, future research should analyze different aspects of fit in more detail, for example, by investigating the influence of specific aspects of fit have on diverse outcome variables. Initial exploratory analyses with our data indeed have indicated that there might be differences between domains. We would propose that research adopting such a more fine-grained perspective should also consider choosing outcome variables with a level of specificity that is comparable to the predictor variables.

Practical implications

All in all, our results indicate a need for a stronger consideration of subjective P-E fit in higher education practice. When the direction of the relationship between fit and study success can be confirmed, P-E fit theory allows for deriving a multitude of measures that may enhance subjective P-E fit. First, the objective demands–abilities fit could be improved because it forms the basis of subjective demands–abilities fit (Edwards et al. 1998, see also Fig. 1). Besides methods for selection or self-assessments before admission, modifying central study abilities and skills is an option. Extracurricular training sessions, for example, on learning strategies, might well help students to develop the abilities needed for their study program and thus increase objective fit. As our results show, individual abilities *exceeding* situational demands might also be detrimental. Additional programs (i.e., increasing demands) for particularly talented students might reduce that gap. For example, such students could receive a faster study program, do extra certificates, or be integrated in additional research tasks. Ability grouping (i.e., grouping students in ability-matched classes) might also be an option, even though one should take into account the possible negative effects of ability grouping on students' academic self-concepts (Marsh 1987). To sum up, not only the students' abilities can be modified to match the demands but also the learning environment can be adapted to match the students' abilities.

Second, the discrepancies between objective and subjective fit could be reduced, which would require helping students estimate their abilities and the academic demands more realistically (see Fig. 1). With regard to study demands, universities and lecturers should make their requirements as transparent as possible. This starts with trivial tasks, such as keeping homepages up to date, but also encompasses more complex tasks, such as becoming aware of implicit requirements for courses and assignments. Furthermore, not only study requirements, but also the reasons for these requirements, should be documented and perceptible. Concerning the realistic appraisal of abilities, students should get regular ability feedback. Feedback can come from several sources, for example, lecturers or other students, but also computer-generated or even implicit feedback (i.e., feedback that is associated with working on specific study-related tasks; Rosman et al. 2015). At its core, students should have the opportunity to anchor their ability assessments to some kind of internal or external criteria. All the given suggestions will lead to a better congruence between the objective and the subjective demands–abilities fit.

Especially in heterogeneous groups, such as in teacher education, it seems necessary to keep the individual student and his or her abilities in mind. In homogeneous groups, for example, study programs with strict selection criteria, where all students have roughly the same abilities, the lecturer can quickly notice if the material and its demands are too easy or too hard because all students feel and probably react in a similar way. Therefore, lecturers of homogenous groups can easily adapt to the audience, perhaps even unknowingly. By contrast, heterogeneous groups are not that easy to handle and therefore might be harder to handle in terms of P-E fit theory.

Conclusions

Our findings show that transferring P-E fit findings from organizational to educational contexts indeed *works*. We therefore advocate a need for a stronger consideration of subjective P-E fit for theory development in higher education research. This might be especially relevant because in higher education, students are free to choose their discipline, and thus may directly influence situational demands. P-E fit theory proves to be a useful framework for analyzing academic success. With its help, we found that (1) it is not sufficient that individual abilities exceed situational demands, but rather that the abilities have to match the demands, and (2) that demands–abilities fit explains the academic success better than perceived abilities alone. Furthermore, our analyses illustrate the methodical peculiarities of assessing fit, which certainly pose a fruitful challenge for future higher education research. With respect to practical implications, our study shows that P-E fit theory is especially suited in higher education because it provides a multitude of approaches to increase academic success. It allows for deriving a multitude of measures to increase student achievement and reduce dropout, thus allowing universities to achieve their educational mission.

Compliance with ethical standards

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