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The first year in higher education: the role of individual factors and the learning environment for academic integration

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Abstract
The transition to higher education and the initial phase of studying play a crucial role in future educational decisions and academic development. To successfully manage this transition, a certain degree of integration into the new environment is required. For this reason, and drawing on the conceptual framework of Tinto's model of student departure, the study examines academic integration as an important first-year experience. Going beyond Tinto's approach and most of the previous research, both individual and contextual factors were analysed by estimating multilevel structural equation models. Data were taken from a panel study of new entrants to higher education institutions in Germany ($N = 10{,}697$), which is part of the National Educational Panel Study (NEPS). The results corroborate previous findings and confirm the importance of psychological attributes like self-esteem and conscientiousness. They also provide evidence that a cognitively activating learning environment enhances academic integration considerably. However, direct instruction was found to negatively affect academic integration. The study concludes with a discussion of limitations and implications for practice and future research.

Keywords Higher education · Academic integration · Learning environment · Personality · Student transition · Multilevel structural equation modelling

Introduction

The transition to higher education and the initial phase of studying have been shown to be crucial for one's future educational career, educational decisions and achievement, and

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academic development (Jenert et al. 2015; Jenert et al. 2017; Trautwein and Bosse 2017). From an individual perspective, the first encounter with higher education and the new life circumstances cause stress because the individual is confronted with new tasks, requirements, environments, people, norms, habits, social relationships, etc. (Briggs et al. 2012; DeBerard et al. 2004; Leese 2010). From a meso or macro perspective, the initial phase of higher education deserves special attention because it sets the stage for either degree completion or dropout from higher education (Tinto 1975, 1993), which continues to be a major political concern in Europe (Vossensteyn et al. 2015).

In higher education research, different conceptualisations of student transition exist (Gale and Parker 2012). In general terms, a transition can be described as a shift between contexts, e.g. between secondary school and higher education, and/or a change in role requirements (Coertjens et al. 2017; Kyndt et al. 2017). To successfully navigate a transition, a certain degree of adjustment or integration into the new setting is required. From a micro-sociological point of view, individual integration basically means incorporation into or becoming/being part of a given environment (Kreckel 1994). Integration involves a "sense of belonging" (Modood 2015) and can have far-reaching consequences. For example, integration into higher education is known to be predictive for study success and persistence (Bowman and Denson 2014; Braxton and Lien 2000).

The relevance of students' initial integration into higher education for their further development is one reason why the present study focuses on integration during the first year in higher education. Another reason lies in certain conceptual features: integration refers to the intersection of the individual and the environment. Integration cannot be fully understood without considering both sides of the coin. Thus, by putting the concept of integration at the centre of attention and taking the role of the individual and the social context seriously, we respond to the call for "moving beyond the individual" (Kyndt et al. 2017, 313).

Integration into college or university is a central concept to Tinto's (1975, 1993) well-known model of student departure. This model distinguishes between social and academic integration and posits that the decision to drop out results from a low level of integration into higher education, especially a low level of academic integration. Following this distinction and acknowledging the greater impact of academic integration, we focus on academic integration as a central challenge for first-year students and an important outcome variable of the initial phase in higher education. However, while Tinto's approach leaves integration more or less unexplained (Braxton et al. 2000; Noyens et al. 2017), we centre on the question of *why* a certain level of integration occurs. More precisely, we seek to quantify the extent to which individual characteristics and contextual attributes impact students' academic integration during the first year in higher education. Regarding contextual factors, we focus on teaching quality as one of the most important environmental variables and examine in particular the role of activating teaching and direct instruction in academic integration.

With the focus on the *why* question, we address one of the gaps in research on academic integration. By examining the influence of both individual *and* contextual factors on academic integration, we try to reduce a second research gap: studies on transition to higher education "need to consider both the contribution of the individual student and the institutional context" (Trautwein and Bosse 2017, 373), but only few studies have taken into account both individual and contextual variables (Noyens et al. 2017). Finally, previous research on students' integration has tended to neglect the role of teaching. Thus, by placing the teaching-learning environment centre stage, our research intends to provide further insights into the drivers of the integration process.

To answer the research questions, we used quantitative data from a panel study conducted with first-year students of the winter term 2010 in Germany (Starting Cohort "First-Year Students" of the National Educational Panel Study, NEPS). The data of 10,697 students were analysed through cross-sectional multilevel structural equation modelling.

Theoretical background and hypotheses

Conceptual framework

When thinking about integration into higher education, Tinto's (1975, 1993) model of student departure immediately comes to mind since the constructs of social and academic integration are an integral part of this framework. This was one reason to take Tinto's approach as a starting point. Another reason lies in his interactionist perspective on integration, which takes into account both the individual student and the institutional environment.

The concept of academic integration comprises several dimensions. Tinto (1975, 104) initially distinguished two dimensions: (1) the structural dimension, or structural integration, which "entails meeting the explicit standards of the college or university" (Braxton and Hirschy 2005, 67), and (2) the normative dimension, or normative integration, which "pertains to an individual's identification with the normative structure of the academic system" (Braxton and Hirschy 2005, 67). In his early work, Tinto considered interaction with faculty to be an indicator of social integration. Later on, he reclassified interaction with faculty as a measure of academic integration (Bahr et al. 2013). We follow this conceptualisation and propose to add (3) a social dimension, or "social academic integration", which refers to intra-curricular interactions with the faculty. We also suggest including in the concept of academic integration (4) a motivational dimension, or "motivational academic integration", which represents the affective dimension of academic commitment and concerns identification with the major and enjoyment of studying. This dimension covers part of Tinto's revised conceptualisation of academic integration as incorporation (Tinto 1993) or, as he stated in a more recent interview, as a "state or perception of fit" with the academic environment (Wolf-Wendel et al. 2009, 419).

Tinto's (1975, 1993) model of student departure includes person-related characteristics, such as family background, academic ability, gender, and prior schooling. However, as a primarily sociological approach, it does not pay much attention to psychological processes. Tinto also considered the role that institutional factors play in the dropout process and looked at the "educational experience in the classroom" (Tinto 1997, 614), in particular, at cooperative learning. However, institutional characteristics and contextual attributes are not systematically addressed (Georg 2009; Kuh et al. 2008). In our view, this represents a weakness of Tinto's approach: integration into higher education and the decision to drop out depend on a broad range of individual and environmental factors (Heublein 2014; Heublein et al. 2017; Kuh et al. 2008). A "mono-causal approach cannot adequately explain the phenomenon of dropout" (Georg 2009, 650). In our study, we, therefore, move beyond Tinto's approach and take into account both individual characteristics, including psychological attributes, and institutional factors.

The role of individual attributes

A lot of research has been carried out to examine the effect of person-related factors, such as psychological attributes, social characteristics, and ability, on dropout or on outcome variables

that are associated with dropout (e.g. satisfaction, performance, and integration). From their systematic review, Schneider and Preckel (2017, 590) conclude that "of all the person-related categories […], the prior achievement and intelligence category shows the strongest relation with achievement" in higher education. Empirical research has also provided evidence that prior achievement is associated with persistence (DeBerard et al. 2004; Heublein et al. 2017; Kuh et al. 2008).

Many studies also have looked into the role of self-beliefs and self-constructs like self-efficacy, academic self-concept, or self-esteem. Theoretically, the link between self-esteem and outcomes of higher education, such as achievement, can be established by referring to self-concept theories. Self-esteem is conceived as a general dimension of self-concept (Wohlkinger et al. 2016). As such, self-esteem is affected by former achievement (skills development approach; Dickhäuser 2006; Marsh et al. 2005; Möller and Trautwein 2015). According to the self-enhancement model, however, the causal relationship might also work the opposite way: in this view, self-concepts are an important determinant of achievement and performance (Dickhäuser 2006; Marsh et al. 2005; Möller and Trautwein 2015). Empirically, self-esteem was found to have a positive correlation with performance (Richardson et al. 2012; Schneider and Preckel 2017).

Furthermore, there are consistent findings that achievement motivation (Busato et al. 2000; Schneider and Preckel 2017) and goal motivation matter, especially mastery goals, which are defined as the desire to master tasks according to self-set standards and to develop and improve competencies (Fenollar et al. 2007; Hsieh et al. 2007). A concept that is closely related to achievement motivation is goal pursuit (Wohlkinger et al. 2011). It refers to strategies of coping with changes or negative experiences, such as poor grades. It should therefore be associated with performance and, hence, with academic integration.

In a meta-analysis, Trapmann et al. (2007) point out that the influence of personality factors on academic success is contingent upon the success criterion, e.g. grades, persistence, and satisfaction. They found that neuroticism is related to academic satisfaction, while conscientiousness turned out to be an important trait for academic achievement in terms of grades. The meta-analysis of Schneider and Preckel (2017) corroborates this finding: Among the 11 personality traits examined, conscientiousness had the largest effect. The remaining Big Five personality factors had no significant impact on achievement nor on retention (Schneider and Preckel 2017; Trapmann et al. 2007). Conscientiousness is assumed to exert its influence on academic integration or, more precisely, academic achievement and success, because it is related to motivation (to perform well or to finish a task), persistence, concentration, effort, and diligence (Kappe and van der Flier 2012; Richardson et al. 2012).

Given the previous research results and theoretical considerations, we hypothesise the following: cognitive abilities, self-esteem, tenacious goal pursuit, and conscientiousness have a positive effect on academic integration (H1).

Many studies investigating the determinants of higher education outcomes take situational and social factors into account, which represent resources, restrictions, and motivation otherwise not measured (e.g. gender, parental educational attainment, student employment, and migration background). These variables are not of primary interest in our study, but we included them in our analyses to reduce the risk of obtaining biased results. Based on previous research, we assume that some of these variables do not only have a direct effect on academic integration but also influence the outcome indirectly by being associated with variables that in turn influence academic integration. For example, it has been consistently found that males report higher self-esteem than females (Bleidorn et al. 2016). Many studies also observed

higher levels of conscientiousness in women than in men (Vianello et al. 2013). With regard to parental education and migration background, there is ample evidence that—particularly in Germany—students from lower social strata and migrant students perform less well at school than their counterparts (OECD 2015; OECD 2016).

The role of contextual factors

The investigation of institutional factors has a longstanding tradition in research on the impact of college attendance. In the USA, this research also examines structural attributes of the higher education institutions, such as size, mission, selectivity, type according to the Carnegie classification, faculty-student ratio, and institutional control. All in all, these variables seem to have only a weak to moderate effect on outcome variables, such as performance, persistence, and learning gains (Pascarella and Terenzini 2005; Pike et al. 2003; Robbins et al. 2004).

As compared with the abovementioned institutional factors, educational variables or characteristics of the learning environment are much more relevant. According to Schneider and Preckel's (2017) review of meta-analyses, instructional methods are substantially correlated with achievement in higher education. On the basis of a literature review, Severiens and Schmidt (2009) found strong evidence for the positive impact of activating and cooperative learning environments on social and academic integration. Their own study confirmed previous research insofar as students in a problem-based learning (PBL) environment showed higher levels of academic and social integration than students in a mixed or conventional curriculum. The study of Georg (2009), who performed a multi-level analysis of the intention to quit, is one of the few that found only a weak institutional influence. He, however, concluded that teaching quality is the most important factor among the contextual variables he analysed.

Theoretically, the effectiveness of activating, cooperative, and/or problem-oriented teaching and learning can be explained by constructivist learning theories: according to these perspectives on learning, learning only happens as a result of an active construction process. Learning is an active process because "knowledge can only be acquired through autonomous and active participation of the learner in the learning process" (Mandl and Kopp 2005, 16). Learning is a constructive process because "knowledge can only be acquired and utilized when it is built into already existing knowledge structures and can be interpreted on the basis of an individual's experience" (ibid.). And learning is also a social process: "The acquisition of knowledge occurs through interaction with others" (ibid.).

Against the background of modern learning theories and considering the outcomes of the short literature review on institutional factors, we propose the following hypothesis: activating teaching approaches contribute to a higher level of academic integration (H2a).

Constructivist teaching methods have been criticised for providing minimal or no guidance and, thereby, being less effective and less efficient than direct instruction (Kirschner et al. 2006), which can be described as a teacher-directed instructional concept (Rosenshine 1987) and which is also referred to as a teacher-centred and transmission-oriented approach (Sawyer et al. 2015). The significance of structure, guidance, and support via direct instruction, especially for novice students, is widely acknowledged (Beaten et al. 2013; Hmelo-Silver et al. 2007; Schmidt et al. 2007). And representatives of a moderate version of constructivist approaches to teaching propose a flexible adaptation of guidance (Schmidt et al. 2007) and "a balance between teacher- and student-centred approaches in order for students to receive adequate structure, guidance, and support" (Beaten et al. 2013, 496).

Considering the benefits of structure, guidance, and scaffolding for novice students and taking into account that the students in our sample are at the beginning of their second year, we advance the following hypothesis: students profit from direct instruction in terms of a better academic integration. Following Kirschner et al. (2006), the positive effect of direct instruction should be stronger than the effect of constructivist teaching (H2b).

Data and methods

Data

We used data from Starting Cohort "First-Year Students" of the National Educational Panel Study (NEPS; doi:10.515/NEPS:SC5:8.0.0; for details see Blossfeld et al. 2011). Employing several data collection methods, this study longitudinally observes a statewide random sample of students, who enrolled at higher education institutions in Germany for the first time in the winter term 2010/2011. The variables are taken from the panel waves 1 to 4, which were conducted between winter 2010 and autumn 2012. The focal outcome "academic integration" was measured at the beginning of the second year in higher education. Using ful information maximum likelihood estimation as a method for handling missing data, a total of 10,697 observations could be included in the analysis.

Variables

As mentioned above, we consider academic integration to consist of four dimensions: structural integration, social academic integration, motivational academic integration, and normative integration. Because normative integration was not adequately addressed in the data set, we measured the focal criterion variable by three dimensions (see Electronic Supplementary Material, Table S-1): the three items of *structural academic integration* (variable "StructInt") focus on the perceived academic performance and were taken from the Fulfilment of Achievement Expectations Scale (Trautwein et al. 2007; Cronbach's alpha (α) = .81). *Social academic integration* ("SocInt") was measured by four items collected from different sources. They capture the intra-curricular interaction with faculty and focus on qualitative rather than quantitative aspects of student-faculty interaction (α = .75). To measure *motivational academic integration* ("MotInt"), a sub-dimension of the Academic Commitment Scale (Grässmann et al. 1998) capturing the affective involvement and identification with the field of study was used (three items; α = .84). The two-level confirmatory factor analysis with second-order factors and freely estimated factor loadings fitted the data well (RMSEA = .027; CFI = .985; TLI = .070; $SRMR_{within}$ = .025; $SRMR_{between}$ = .074). All factor loadings exceeded the value of .60.

Self-esteem as one of the individual predictors of academic integration was measured using the revised scale described by von Collani and Herzberg (2003) (variable "SelfEst"; ten items; α = .82; details on the individual and social predictors are given in the Electronic Supplementary Material, Table S-2). The concept of goal pursuit was operationalised by a shortened version of the instrument that has been proposed by Brandtstädter and Renner (1990) and that consists of two scales. For the purpose of this paper, we focused on the scale *tenacious goal pursuit* (variable "TenGoal"; five items; α = .76). For the Big Five personality factor *conscientiousness* (variable "B5Consc"), we used a two-item operationalisation, which has been developed by Rammstedt and John (2007) (r = .36). As indicator of cognitive abilities, we

selected *reading competencies* ("Read"), which were tested in wave 1. Person ability was estimated by Warm's (1989) weighted likelihood estimation (WLE).

Finally, four binary indicators of social and situational factors that represent resources, restrictions, and motivation, otherwise not measured, were included in the analyses: *gender* ("Female"; 1 = female, 0 = male), *migration background* ("Migrant"; 1 = yes (first or second generation), 0 = no), *parents' education* ("ParEdu"; 1 = degree (either father or mother), 0 = no degree), and *student employment* ("Employ"; 1 = more than 5 h per week during term time, 0 = up to 5 h per week).

Regarding contextual factors, we used two scales of a learning environment instrument described by Schaeper and Weiß (2016). *Constructivist teaching* ("ConTeach") was operationalised by four items ($\alpha = .80$; see Electronic Supplementary Material, Table S-3). The scale *direct instruction* ("DirInstr") is composed of three items ($\alpha = .82$) and focuses on a transmission model of instruction with students as passive recipients of knowledge.

The field of study and the type of higher education institution, too, are important contextual characteristics. It turned out, however, that the effect of these factors on academic integration was mostly insignificant when we introduced the learning environment variables in the estimation model. We, therefore, did not include field of study and type of higher education institution in our analysis.

For all multi-item factors, composite scales were constructed by taking the mean of the respective variables with non-missing values.

Table S-4 (Electronic Supplementary Material) gives a descriptive overview of the variables used in the estimation models. The intercorrelations of the variables used in the study are given in Table S-5.

Methods

To account for the nested data structure and to assess contextual effects, we estimated multilevel structural equation models using the Mplus software, version 7.11 (Muthén and Muthén 2015). We distinguished two levels: students at level 1 (L1) and a combination of subject area (nine categories: humanities/arts, social and political sciences, economics/business administration, law, sciences, health/veterinary, engineering, teacher training, others) and higher education institution at the aggregate/group level 2 (L2). After excluding small ($n < 10$) level two units (clusters), 263 clusters with an average size of 41 remained in the analyses.

Academic integration was included as a latent variable, taking the three composite scales of structural, social, and motivational academic integration as observed indicators. All other variables entered the analyses as manifest variables. Following the recommendation of Lüdtke et al. (2009), we centred continuous covariates that were only included at the individual level (e.g. self-esteem) at the grand mean. Explanatory variables that were specified at both levels (constructivist teaching, direct instruction) were centred at the group mean when analysed as individual level predictors. The aggregated measures of the learning environment, which were introduced as predictors at the group level, were computed as the group-specific mean of the composite learning environment scales and were not centred. The intra-class correlations ICC(1), which is an index of the proportion of variance due to the clusters or of the average agreement between pairs of individuals within the same group (Marsh et al. 2012), was .24 for constructivist teaching and .25 for direct instruction. The reliability of the group average ICC(2) was .95 for both constructivist teaching and direct instruction. These values indicate a sufficient degree of reliability of the group-mean ratings (Lüdtke et al. 2009). Interrater agreement was assessed by the average deviation index (Lüdtke et al. 2007). The value of

.54 for both contextual variables was lower than the cut-off value of .83 and indicates satisfactory interrater agreement.

In the case of group-mean centred individual-level predictors, a contextual effect occurs when the effect at the aggregated level is significantly different from the effect at the individual level (Marsh et al. 2009). Therefore, we assessed the contextual effect of the learning environment by testing the difference between the L1 and L2 regression coefficients for statistical significance.

We estimated several multilevel models, starting with an intercept-only model. The intercept-only model serves as a point of reference and gives information on the proportion of variance that is due to the cluster membership. To calculate ICC(1) for academic integration, we estimated this model with equal factor loadings. In the other models, the factor loadings were not constrained.

Results

According to the intercept-only model, the value of ICC(1) was .09; that is, differences between the clusters accounted for 9% of the total variance in academic integration. This value seems rather low, but it is quite common in educational research and can be considered to represent a medium effect (LeBreton and Senter 2008). In addition, it has to be taken into account that the clusters are not very homogeneous in terms of field of study but comprise quite different study programmes, such as biology and physics. The fit of this model with invariant factor loadings was acceptable (RMSEA = .031; CFI = .994; TLI = .982; $SRMR_{within}$ = .003; $SRMR_{between}$ = .121). When factor loadings were not constrained, $SRMR_{between}$ improved considerably and remained below the cut-off value of .08. In the estimation models described below, equality constraints were not imposed.

The results of the model with individual and social variables as predictors of academic integration (Table 1, model 1) indicated a satisfactory model fit (RMSEA = .028; CFI = .958; TLI = .932; $SRMR_{within}$ = .025; $SRMR_{between}$ = .012). All predictors had a significant effect on the criterion. Gender and parents' education, however, only indirectly influenced academic integration. The explained variance at the individual level was 17%.

The learning environment variables were first examined separately. Constructivist teaching was able to explain 24% of the variance in academic integration between individuals and 78% of the variance between clusters (Table 1, model 2). The contextual effect was highly significant. The value of .11 represents the expected difference in academic integration between two students who have the same individual perception of constructivist teaching (relative to the cluster mean), but who are located in different clusters that differ by one unit in mean constructivist teaching. Direct instruction accounted for 6% of the within-cluster variance and for 66% of the between-cluster variance (Table 1, model 3). However, the effect of this variable was negative, meaning that transmission approaches to teaching reduced academic integration. Again, the contextual effect was highly significant. The model fit was good (model 2) to excellent (model 3).

When the effects of constructivist teaching and direct instruction were estimated simultaneously, the explained variance was the same as in model 2 and the effect of direct instruction disappeared (results not shown). This is a consequence of the considerable negative correlation between the two scales ($r = -.56$). Since the inclusion of direct instruction did not add any additional information, we estimated the full model without direct instruction (Table 1, model 4).

Table 1 Multilevel structural equation models for academic integration (fixed effects only; random part, measurement model, intercepts, and covariances not shown; unstandardised estimates)

Dependent variable –Predictor	(variable name)	Model 1 Est. (SE)	Model 2 Est. (SE)	Model 3 Est. (SE)	Model 4 Est. (SE)
Level 1, direct effects					
Conscientiousness	*(B5Consc)*				
–Gender	(Female)	.36 (.02)***			.36 (.02)***
Self-esteem	*(SelfEst)*				
–Gender	(Female)	−.11 (.01)***			−.11 (.01)***
Ability	*(Read)*				
–Parents' education	(ParEdu)	.19 (.03)***			.19 (.03)***
–Migration background	(Migrant)	−.22 (.05)***			−.22 (.05)***
Academic integration					
–Self-esteem	(SelfEst)	.21 (.01)***			.15 (.01)***
–Tenacious goal pursuit	(TenGoal)	.10 (.01)***			.06 (.01)***
–Conscientiousness	(B5Consc)	.07 (.01)***			.04 (.01)***
–Ability	(Read)	.03 (.01)***			.04 (.01)***
–Migration background	(Migrant)	−.05 (.01)***			−.04 (.01)***
–Student employment	(Employ)	−.02 (.01)*			−.02 (.01)**
–Constructivist teaching	(ConTeach)		.18 (.01)***		.20 (.01)***
–Direct instruction	(DirInstr)			−.10 (.01)***	
Level 1, indirect effects					
Academic integration					
–Gender (via self-esteem)	(Female)	−.02 (.00)***			−.02 (.00)***
–Gender (via conscientiousness)	(Female)	.03 (.00)***			.02 (.00)***
–Parents' education	(ParEdu)	.01 (.00)**			.01 (.00)***
–Migration background	(Migrant)	−.01 (.00)**			−.01 (.00)***
Level 1, total effects					
Academic integration					
–Gender	(Female)	.00 (.00)			−.00 (.00)
–Parents' education	(ParEdu)	.01 (.00)**			.01 (.00)***
–Migration background	(Migrant)	−.05 (.01)***			−.05 (.01)***
Level 2					
Academic integration					
–Constructivist teaching	(ConTeach)		.29 (.03)***		.29 (.03)***
–Direct instruction	(DirInstr)			−.29 (.03)***	
Contextual effects					
–Constructivist teaching	(ConTeach)		.11 (.03)***		.09 (.03)**
–Direct instruction	(DirInstr)			−.19 (.03)***	
R^2 academic integration (level 1)		.17	.24	.06	.38
R^2 academic integration (level 2)			.78	.66	.76
RMSEA		.028	.028	.000	.035
CFI/TLI		.958/.932	.995/.980	1.00/1.00	.935/.899
$SRMR_{within}/SRMR_{between}$		.025/.012	.007/.059	.000/.018	.031/.054
Number of cases		10,697	10,697	10,697	10,697

* $p < .05$; ** $p < .01$; *** $p < .001$

According to all but one of the fit indices, the full model fits the data well. The variables included at the individual level accounted for 38% of the within-cluster variance and the group-level predictors for 76% of the between-cluster variance of academic integration. When comparing the regression slopes of the full model with the more restricted ones, it becomes

apparent that most of the estimates were quite stable and remained significant. Further inspection of the data revealed that the contextual variable affected the three dimensions of academic integration differently and that the contextual effect of constructivist teaching was strongest (and highly significant) for structural academic integration; significant, albeit smaller, for social academic integration; and not significant for motivational academic integration. All fit indices for this model were acceptable.

Figure 1 visualises the relationships between the different variables and constructs of the full model and reports standardised estimates, which are better suited to compare the size of the regression coefficients of continuous covariates within a model. The diagram shows that gender, as already mentioned, had no direct effect on academic integration, but that the gender effect was mediated by self-esteem and conscientiousness. Female students reported lower levels of self-esteem than males ($\hat{\gamma}_{\text{stand}} = -.11$) but showed a considerably higher level of conscientiousness ($\hat{\gamma}_{\text{stand}} = .23$). Self-esteem ($\hat{\gamma}_{\text{stand}} = .25$) as well as conscientiousness ($\hat{\gamma}_{\text{stand}} = .12$) had substantial positive impacts on academic integration. As a result, the indirect gender effect operating through self-esteem was negative and weak, but highly significant, while the indirect gender effect through conscientiousness was equal in size but positive and also highly significant (Table 1, model 4, level 1, indirect effects). In sum, female students were as well integrated into higher education as male students (Table 1, model 4, level 1, total effects).

The effect of parental education was mediated by reading competencies. Students whose parents obtained a degree performed significantly better in the reading competence test than "first-generation" students ($\hat{\gamma}_{stand} = .11$). Because reading comprehension positively and significantly impacted academic integration ($\hat{\gamma}_{\text{stand}} = .11$), the indirect effect from parental

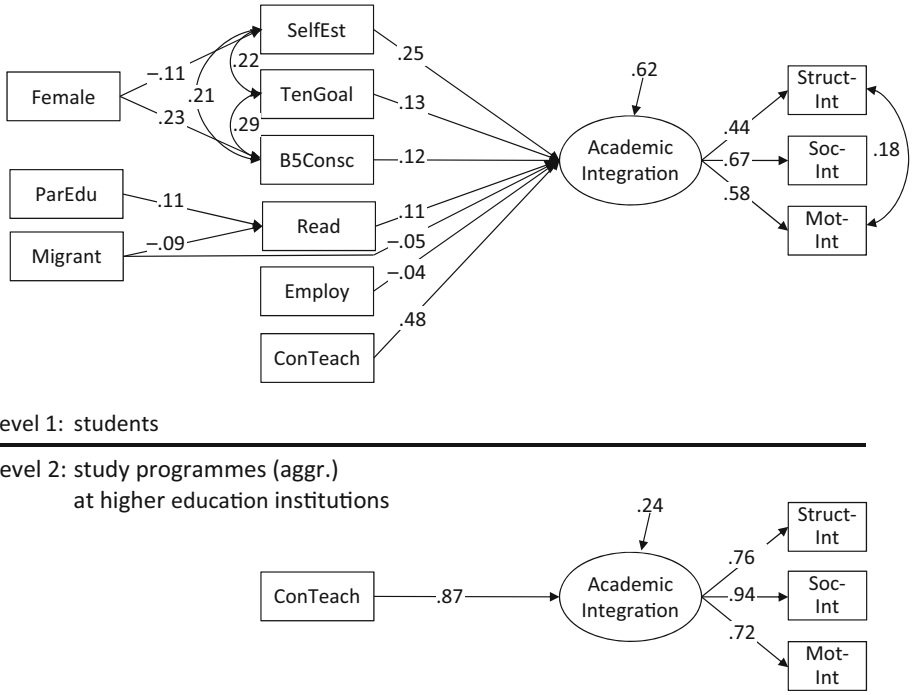

Fig. 1 Multilevel structural equation model for academic integration (standardised estimates, all estimates significant at $p < .05$)

education on academic integration was positive and significant (Table 1, level 1, indirect effects). The influence of migration background on academic integration, too, was mediated by reading competencies: non-migrant students outperformed students with a migration background significantly ($\hat{\gamma}_{\text{stand}} = -.09$). While this indirect effect was significant, migration background also directly and negatively affected academic integration ($\hat{\gamma}_{\text{stand}} = -.05$). The total effect amounted to − .05 (unstandardised, Table 1, model 4, level 1, total effects) or − .06 (standardised). As expected, student employment was negatively and significantly related to academic integration ($\hat{\gamma}_{\text{stand}} = -.04$); that is, students who spent more than 5 h per week on paid employment during term time were less integrated than students who were not employed or only marginally employed.

As far as the influence of the learning environment is concerned, it turned out that constructivist teaching was an important predictor both at the individual and the group level. Clusters in which students collectively rated teaching to be constructivist showed higher average levels of academic integration than clusters with a lower degree of constructivist teaching ($\hat{\gamma}_{\text{stand}} = .87$). Seventy-six percent of the between-cluster variance could be attributed to this variable alone. At the individual level, the coefficient had the same direction as at the group level but was smaller, resulting in a significant contextual effect, as already mentioned.

As indicated by the change in R^2, the individual perception of the learning environment explained more of the variance in academic integration than all other L1 variables taken together. However, it should be kept in mind that R^2 strongly depends on the variables included in the analysis. Including an additional individual predictor could alter the picture considerably. In addition, different measurement points should be taken into account. While the learning environment was measured in the same panel wave as the outcome variable, information on all other predictors were collected in earlier or later panel waves.

Discussion and conclusion

Our study had the objective of providing new insights into individual attributes and contextual factors that shape experiences during the transition to higher education and the initial phase of studying. It focused on academic integration as an important first-year experience and a concept that integrates individual and contextual theoretical perspectives. By analysing the impact of individual factors and the role of contextual attributes simultaneously, we followed the often-expressed need to move beyond the individual. By using multilevel structural equation models, we chose a statistical tool that is particularly well suited when contextual attributes were assessed by individuals and the researchers are interested in identifying contextual effects. By concentrating on the learning environment, we addressed one of the context dimensions that are most important for student outcomes and that, at the same time, are amenable to interventions.

Our first hypothesis referred to the role of individual attributes and suggested that self-esteem, cognitive abilities, conscientiousness, and tenacious goal pursuit positively affect academic integration. The empirical analysis—using NEPS data on a sample of first-year students in German higher education—provided support for this hypothesis. Among the psychological factors, self-esteem was found to be particularly important. Since self-esteem resembles self-efficacy insofar as both are self-constructs, this result is in accordance with many studies that consistently found self-efficacy to be an important factor for educational outcomes (Richardson et al. 2012; Schneider and Preckel 2017). In line with theoretical

expectations and previous results, gender and social and migration background had an indirect effect on academic integration via self-esteem and conscientiousness (gender) and via reading competencies (social and migration background). Migration background does not only reduce academic integration indirectly because it is associated with lower levels of reading competencies but also has a direct effect, independent of parental education and ability. As expected, the effect of reading competencies is positive and significant. However, compared with existing studies that identified ability to be highly relevant for achievement (Richardson et al. 2012), the effect is rather small.

What are the practical implications of the results regarding the role of the individual characteristics examined? One might argue that not much can be done when stable traits of individuals are concerned. However, recent research has shown that even personality factors are less stable than often assumed (Lüdtke et al. 2011; Specht et al. 2014; Wagner et al. 2013). Psychological attributes are influenced by past experiences and socialisation processes and can therefore be changed by new experiences and interventions. Applied to our finding that female students reported lower levels of self-esteem and higher degrees of conscientiousness than male students, we may conclude that encouraging self-esteem, in particular for women, and increasing conscientiousness, especially for men, can improve integration into higher education considerably.

In our second hypothesis, we put forward the assumption that educational practices matter, in particular activating teaching approaches. The students in our data set were at the beginning of their second year in higher education and, hence, possibly needed a certain amount of guidance. Therefore, we also expected direct instruction to be beneficial and to be even more important for academic integration than constructivist teaching. This hypothesis was not confirmed. On the contrary, higher subjective and collective ratings of direct instruction resulted in lower levels of academic integration. However, there was strong empirical evidence for the positive effect of activating teaching. Learning environments that apply constructivist approaches to teaching and learning enhanced academic integration considerably. While the latter finding corroborates previous research (e.g. Severiens and Schmidt 2009), the former contradicts the theoretical expectation as well as existing evidence (e.g. Beaten et al. 2013). However, our results do not imply that transmission-oriented teaching is generally disadvantageous for student learning and integration. We did not analyse experimental data on different teaching-learning settings in a specific situation but survey data that capture a broad view of the learning environment in the study programme or department. Therefore, the results rather suggest that learning environments that are *predominantly* characterised by direct instruction result in lower levels of academic integration while students profit from learning environments that are perceived as mainly activating. Such learning environments may and should also include elements of direct instruction. Theory and empirical studies suggest that students benefit most from learning environments that apply a mix of a teacher-centred knowledge transfer and student-centred knowledge construction (Beaten et al. 2013; Meng and Heijke 2005).

The results of the learning environment factors that were examined at the individual and the group level also suggest that the context is influential in two ways (Bronfenbrenner 1979): First, it impacts as an objective reality or as an environment that exists independent of the individual perception. This is indicated by the considerable (contextual) effect of the aggregated learning environment variables, which reflect the shared perceptions of the learning environment, corrected for individual idiosyncrasies. Second, it operates through individual perception, as indicated by the effect of the learning environment variables at the individual level.

At the individual level, the individual perception of the learning environment was able to explain a larger proportion of variance in academic integration than person-related factors. This finding does not necessarily imply that the perceived context matters more than individual attributes. In the data set used for our analyses, one of the strongest predictors of educational outcomes, academic or performance self-efficacy (Richardson et al. 2012; Schneider and Preckel 2017), was not measured. In addition, the validity and reliability of the conscientiousness measures is limited. As a consequence, the effect on academic integration might be underestimated. In other studies, conscientiousness was shown to have a stronger association with higher education outcomes, such as achievement, than self-esteem (Richardson et al. 2012; Schneider and Preckel 2017). As already mentioned, it should also be taken into account that the outcome variables and the learning environment were measured at the same time. On the one hand, this could have resulted in an overestimation of the correlation with academic integration. On the other hand, measuring predictor and outcome at the same time might cast doubt on the causal relationship.

We are convinced that studies of the kind we conducted advance research on higher education outcomes and their determinants. Still, a lot of work lies ahead. For example, in our study, integration was measured at the beginning of the second year in higher education, a point at which half of the dropouts in German bachelor's programmes have already happened (Heublein et al. 2017). Panel studies with more measurement points during the first year in higher education would make it possible to avoid bias resulting from a restricted sample due to dropout and to examine the longitudinal process of integration in more detail. Another promising issue for future research is to focus on the *interplay* between the individual and the environment. Although theory suggests that the impact of contextual characteristics is contingent upon individual attributes and vice versa, interaction effects have rarely been examined in higher education research so far.

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