Effects of students' perseverance and passion for long-term goals on their competence development in accounting

Objectives
In recent years there has been a marked increase in interest in the relation between grit and achievement. According to grit theory, ability or talent, are not sufficient predictors of success. In fact, academic achievement is affected by students’ perseverance and passion for long-term goals too. So far, grit has been studied in domains like math (Duckworth et al. 2007), but not in vocational education and training (VET) domains.

Theoretical Framework
Educational psychology in German-speaking countries focusses – next to cognitive abilities – on motivational student characteristics. Traditionally, concepts such as (intrinsic) motivation, (academic) self-concept and volition are analysed when explaining student learning processes and outcomes (see Hasselhorn & Gold, 2006). In contrast, student characteristics like persistence are mentioned only peripherally. This is surprising since everyone knows from personal experience that persistence and engagement are vital student virtues for performing well in schools. Moreover, learning theories (e.g., Vygotsky, 1978) postulate that learning occurs when students work on assignments or problems that require advanced knowledge and assist from experts. It seems obvious that learning is a process that challenges students and sometimes also hurts. Learners who give up early and are not willing to go to the limits may not gain new competencies. Thus, from a theoretical point of view perseverance might represent another feature of well performing students. Duckworth, Peterson, Matthews, and Kelly (2007) tried to conceptualize this feature systematically. They propose that two dimensions characterize grit: perseverance of effort (striving harder to accomplish goals despite the hardships faced) and consistency of interests (showing steady interest over time). Against the
framework of that concept our aim is to analyse the effect of students’ grit-facets on their academic outcomes.

Research on grit. Datu, Yuen, and Chen (2016) give an overview of the influence of grit on academic achievement, engagement, motivation, and even well-being. Interestingly Duckworth et al. (2007) found that grit was associated with higher GPAs but with lower SAT scores. These findings indicate that the grit effect depends on the learning context. In the mentioned study the authors explain the unexpected finding referring to the assumption, that among a relatively intelligent student sample less bright learners compensate their deficits by working harder and with more determination (ebd., p. 1093).

Research on determinants of students’ academic achievement in accounting. With regard to research in German-speaking countries hardly any attempts to analyse students competence development in accounting exist. In a longitudinal study Helm (2015) found that students’ proficiency in mathematics, their grades, perceived cognitive activation and support from teachers of their basic psychological needs most strongly predicted student accounting competence. Furthermore, student intrinsic motivation and academic self-concept were related to competence in accounting.

Since (a) accounting competence is predicted by students’ motivation and (b) grit is related to both, motivation and academic achievement, we assume positive correlations between Austrian VET students’ grit and academic achievement (in accounting) too.

Methodology

Study design and sample. As the literature review has shown, there have been very few attempts to investigate the effects of students’ grit on students’ learning. The present study overcomes these shortcomings by analysing longitudinal data from 24 commercial upper secondary school classes from grades 9 through 13 in Austria. The participants completed online questionnaires and competence tests at the end of grades 9–13. In total, 852 students took part
in the longitudinal study. However, the grit scale was assessed at grade 12 – a point in time at which already 5 classes from lower track have been completed and thus not accessible. Additionally, student dropouts and repeater decreased the sample further. In the end 323 students (61% girls; M_age at t1 = 14.2 years, SD_age at t1 = 0.23) completed the grit questionnaire. Out of these 323 students 257/274/259/287/170 reported grades and test scores at grade levels 9-13. We used FIML-estimation in Mplus to control for missing data.

Measures.

Grit. In order to assess students’ perseverance and passion for long-term goals the so-called BISS scale (Beharrlichkeit und beständigem Interesse Skala, Fleckenstein et al. 2014) was used. The German-speaking BISS scale is based on the original English-speaking scale by Duckworth and colleagues constructed in 2007 (Duckworth et al., 2007) and was validated for German-speaking teacher students (Fleckenstein et al. 2014). The scale comprises 12 items. 6 items intend to measure students’ passion for long-term goals (e.g., New ideas and projects sometimes distract me from previous ones.). Another 6 items intend to measure students’ perseverance (e.g., I am diligent.). The classical Cronbach’s alpha reliability coefficients are .76 and .77. However, confirmatory factor analysis revealed a miss fit for the passion-facet. Only when excluding two items the twofacet model fitted (CFI .937, RMSE .066).

GPA. As first indicator of student academic achievement their grades were collected at grade levels 9 to 13. Students were asked to report their latest exam grade and their latest school report grade in the subjects accounting, business, math and german. In Austria grade 1 equals excellent and grade 5 equals failed. For easier legibility and interpretation of the findings the grades were first inverted and then averaged to a grade point average (GPA) for each school year.

Accounting competence. As second indicator of student academic achievement the standardized instrument Test of Basic Bookkeeping Knowledge (“Wissensüberprüfung von Ba-
siskenntnissen der Buchhaltung”, WBB, Helm, 2016) was used to assess students at the end of each school year from grade 9 to 13. The students had to complete between 30 and 53 items depending on the grade level version of the test. These items essentially required doing book entries of current business transactions (with and without receipts), and the preparation of changes in bookings and additional entries in line with an annual financial statement. Additionally, students had to solve tasks from the controlling domain, such as calculating the break-even point or the optimal production program. These tasks are derived from the competence model developed by the task force for Austrian vocational educational standards (http://www.bildungsstandards.berufsbildendeschulen.at). In order to obtain the competency values in accordance with the item response theory (Rasch model), (1) student responses were code 1 (correct answer) and 0 (incorrect answer) and (2) marginal and conditional maximum likelihood estimations were performed. These analyses at both test and item level revealed satisfying reliability (see Helm 2016 for Rasch model checks at item and test level).

**Analysis.** To test our hypothesis regarding the positive impact of students’ grit facets on their academic outcomes we analysed bivariate correlations (see Figure 1 and 2). Using Mplus (Version 7; Muthén and Muthén 1998–2014) we obtained within-class correlation coefficients. This means that students’ grades and test scores were corrected for their class-mean (= group-mean centering, Enders and Tofghi, 2007). Otherwise the reported correlation coefficients would be biased due to the fact that some teachers give good marks more easily than others. While in the present paper we only report bivariate correlations, we attempt to analyse the grit effect on students competence development in accounting using latent growth curve modelling (Muthén & Asparouhov, 2002). Since these analyses are still in progress we console the reader for the conference.
Results

By the date of submission we were able to carry out early findings presented in Figure 1 and 2. Structure equation modelling led to the following results: While passion for long-term goals is neither related to students’ GPA nor to students’ accounting test scores at any grade level, perseverance is a positive predictor of students’ academic outcomes. Students’ persistence predicts GPA and accounting test scores at all grade levels. The corresponding standardized coefficients range from .179 ($p = .045$) to .341 ($p = .000$), indicating a moderate effect size.

Figure 1. Association between grit and GPA at grade 9 to grade 13

Note. Dashed lines represent non-significant coefficients. n.s. = not significant. ** = $p$ values < .01.
Figure 2. Association between grit and accounting test scores at grade 9 to grade 13

Note. Dashed lines represent non-significant coefficients. n.s. = not significant. ** = p values < .01.

Conclusions

Our trivial assumptions postulated that students’ perseverance and passion for long-term goals are related to their academic outcomes in the subject accounting. The findings presented are consistent over all grade levels and thus they clearly show that these hypotheses are only partially confirmed. While perseverance is positively related to students’ academic outcomes students’ passion for long-term goals is not, surprisingly. In our view there are two reasons for the missing linkage between passion for long-term goals and students’ academic outcomes. First, the scale “passion for long-term goals” did not work as assumed. Based on confirmatory factor analysis we had to exclude two items narrowing the construct validity (Fleckenstein et al., 2014). Second, moreover the scale consists of items referring to students’ experiences with project work. On the one hand “project work” is an unfamiliar term to students. On the
other hand, project work is not relevant to (teaching and) learning in accounting – in contrast, being a diligent person is! Compared to findings in mathematics (Duckworth et al., 2017) we could show that the predictive validity of grit is not only limited to students’ grades. Grit predicts objectively assessed competences in accounting too. However, since these early findings are based on bivariate analyses they are limited in the sense that we did not control for students characteristics such as their prior competencies or their intrinsic motivation which seem strongly related to grit. Thus our further analyses will take into account these aspects and will focus more strongly on the power of grit for predicting students’ academic competence development. Therefore, we will specify a latent growth curve model (Muthén & Asparouhov, 2002) that captures the initial and developmental part of students’ accounting competence over five years of VET education in Austria. Our key interest is whether both, the initial and developmental part of the specified model are predicted by grit.

With regard to practical significance our early findings not only represent evidence for grit playing an important role in students’ learning processes but also raise the question how teachers (as well as school authorities and school leaders) and parents can support students’ perseverance. It is therefore necessary to investigate the effects of learning contexts (e.g., Datu, 2017) as well as teachers’ and parents’ behaviour on students’ grit.

The paper presentation will include a substantive discussion on the nature of the subject accounting and how this nature (a) supports students’ grit and (b) moderates the relation between grit and students’ academic achievement.

**Contributions and Scientific importance of this work**

The question of how grit is assessed and whether it is related to students’ academic achievement represents a new and innovative field of educational research. Since grit challenges the relevance of traditional psychological constructs (above all the Big Five) it attracts attention in educational psychology. The present study contributes to understanding the role of grit
among other psychological student characteristics when it comes to explain learning outcomes. Thus, in our view the study is of scientific importance.

**Selected Literature**


