TRANSITION SCHOOL – UNIVERSITY: MEASURING MATHEMATICS FRESHMEN'S ACADEMIC BUOYANCY

Irene Neumann, Colin Jeschke & Aiso Heinze

IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

With mathematics freshmen, high dropouts are to be observed. Dropout does not seem to be only due to lacking knowledge but also due to unfavourable affective factors. Academic buoyancy may therefore be an important factor to be considered when examining dropouts. Academic buoyancy describes students' ability to cope with everyday setbacks, challenges, and pressures in a learning context that is "students' everyday academic resilience" (cf. Martin & Marsh, 2008, p. 53). We adapted academic buoyancy to the university context for mathematics freshmen and developed a questionnaire with the goal to assess this construct.

The questionnaire contained 11 Likert-type items addressing setbacks related to obligatory mathematics exercises, as these are the most pressing instances in the first semester (e.g., "If I don't manage to solve a math problem in less than three attempts, I resign.", "I don't mind to puzzle over a complex math problem for a whole afternoon or even longer."). Each item contained a 7-point Likert-scale (1 = strongly disagree, 7 = strongly agree). To check construct validity, we administered a Big Five personality scale. The sample comprises 100 mathematics and informatics freshmen (68% male, mean age 20.7) in their first week at university. For both groups a mathematics lecture and related exercises are obligatory in their first semester.

Based on an exploratory factor analysis two items were removed from the academic buoyancy scale (the items addressed the consequence of quitting the studies while the others did not). The remaining nine items showed a good reliability ($\alpha = .89$) and the distribution was fine ($M = 4.61$, $SD = 1.13$). As desired from a theoretical perspective, there was a medium correlation with the Big Five factor "conscientiousness" ($r = .42$, $p < .001$) but no correlation with the other four Big Five factors. Accordingly, we successfully developed a reliable instrument measuring academic buoyancy for mathematics freshmen and we have first evidence for convergent and discriminant validity. We think that this instrument is useful to shed further light on the crucial phase of the first semesters within mathematics studies. Currently, we collect data on content validity (expert rating) and prognostic validity (students' examination results) to finalize the quality check of the instrument.

References

Martin, A. J., & Marsh, H. W. (2008). Academic buoyancy: Towards an understanding of students' everyday academic resilience. *Journal of school psychology 46*, 53-83.

2015. In Beswick, K., Muir, T., & Fielding-Wells, J. (Eds.). *Proceedings of 39th Psychology of Mathematics Education conference*, Vol. 1, p. 237. Hobart, Australia: PME.