

Summary of the project - FK124225

The aim of the present project was to examine — via survey, experimental, and intervention studies — if the combination of mindfulness and growth mindset inductions or interventions can result in more positive effects compared to using only one of these methods alone. We expected stronger study motivations, better grade average, and lower dropout at project start. All three research phases (survey, experimental, and intervention) were completed, and more than a dozen publications were produced during the project. The project also aimed to support the scientific socialization of young researchers as an incubator. Thus a number of publications were produced that were not directly related to the main topic of the project but were related by the methodology and the researchers involved. In addition, the project provided an opportunity to test a number of new interventions (prosocial goals intervention, general performance intervention, strategic learning intervention), which may be published as journal articles later. In addition, the project has built a number of links with secondary and higher education institutions (e.g. BME, ELTE, SZTE, NKE, NYE). Overall, we have fulfilled the commitments of the project, in addition to being able to demonstrate a number of other achievements.

1. Self-reported survey

Growth mindset beliefs promote adaptive motivations, learning, and challenge seeking; however, the learning process promoted by a growth mindset is not always a joyride. It can be especially true if one faces harsh criticism. Mindfulness might be hypothesized as a potential adaptive mechanism in a negative feedback situation. The present research examined the interplay between growth mindset beliefs (GMS) and trait mindfulness (MFS) regarding the motivation to learn from negative feedback. We distinguished three forms of engagement with negative feedback (over-engagement, disengagement, and constructive engagement) as potential setback-specific mediators between GMS, MFS and learning from negative feedback. With cross-sectional methods, on a diverse Hungarian sample (N = 1,469), we found that both GMS and MFS are positively and directly related to the motivation to learn from negative feedback. GMS was negatively related to disengagement and was unrelated to over-engagement as well as constructive engagement, while MFS was negatively related to both disengagement and over-engagement, but positively related to constructive engagement. While disengagement was negative, both over-and constructive engagement were positively related to learning from the negative feedback. In sum, these results suggest that GMS beliefs do not let individuals to disengage from negative feedback, but do not provide guidelines for constructive or over-engagement with negative feedback. Complementarily, MFS promotes the struggling way of learning characterized by constructive engagement, and inhibit the suffering path of learning characterized by over-engagement with the negative feedback.

2. Experimental study

Negative feedback in academic settings is often unavoidable, although it may directly interfere with the ultimate goal of education. Setbacks can diminish motivation, and in more extreme cases, it may even lead to dropping out of school. Previous research suggests that certain predispositions, inductions, and interventions might mitigate the harmful effects of negative feedback. Among others, growth mindset beliefs and mindfulness meditation were proposed as the most promising candidates that may help students to retain motivation. In a pre-registered, randomized experiment, we gave a disappointing evaluation to 383 university students in a bogus laboratory IQ test situation. Half of the participants previously received a growth mindset induction referring to intelligence as a malleable characteristic, while the other half received a fixed mindset induction referring to intelligence as a stable characteristic that cannot be changed. Then participants had a brief mindfulness meditation session or a control condition. Subsequently, they could choose to complete practice tasks before the final IQ assessment. The number of completed optional tests was used as a behavioral proxy for effort. The results showed no difference in effort for the growth mindset or the mindfulness meditation groups, compared to the other conditions. However, those that reported having a higher (compared to a lower) dispositional mindfulness completed more optional tasks after mindfulness meditation. We concluded that our brief mindset and mindfulness inductions may not be adequate for everyone to alleviate the demotivating effects of negative feedback, but it does not necessarily mean that mindfulness cannot help implementing a growth mindset.

3. Intervention study

Does holding a growth mindset prevent people from experiencing potentially negative and maladaptive thoughts and feelings following academic setbacks? Not necessarily: In our Hungarian sample — a culture high in negative affect —, three-fourths of people who endorsed a growth mindset at a maximum level nonetheless reported at least sometimes being judgmental of themselves and ruminating about setbacks. Thus, in two field experiments performed in Hungary, we incorporated mindfulness elements into an existing growth-mindset intervention. These elements focused on accepting but distancing the self from negative thoughts and feelings in response to setbacks. This enhanced growth-mindset treatment significantly raised semester grades among university ($N = 251$, Study 1, $d = 0.29$) and high school students ($N = 3,095$, Study 2, $d = 0.17$). The growth-mindset intervention alone also raised GPA with an effect size similar to those found in prior research (Study 2); however, this effect did not consistently reach significance across models with the present sample size. The present studies suggest the value of incorporating mindfulness elements to help people manage a tendency toward negative and counterproductive thoughts and feelings that may remain even following a mindset intervention.

Spinoff study 1: Purpose intervention

Prior US-based intervention research showed that promoting prosocial purpose for learning can motivate students to work hard on learning tasks if they face tedious and hard tasks. People with different cultural and historical backgrounds can identify with different prosocial aspects. The present randomized controlled trial field experiment aimed to investigate the efficacy of the prosocial purpose intervention in the Hungarian cultural context. We expected that university students ($N = 277$) — especially those who have low socioeconomic status — would resonate with communal prosocial goals related to close family and friends than with distal goals related to broader groups. The intervention did not only close the social class GPA achievement gap between first- and continuing-generation students, but its grade benefit remained persistent in the subsequent three semesters. It appears that in the Eastern European context, among first-generation students, the prosocial purpose intervention resonates with family values and it results in long-lasting academic achievement benefits.

Spinoff study 2: General intervention

The “general intervention” integrated prior interventions including elements from a growth mindset intervention, social belonging intervention, prosocial purpose intervention, cultural fit intervention, stress mindset intervention and stress reappraisal work. Furthermore, we aimed to build on previous results in which time pressure and stress appear as a front worry, while also addressing core worries in the background. We used a two-armed experimental design. In the intervention group, students could read about various worries that they naturally experience during their studies. Then they were shown how these worries can diminish over time, and read about student testimonials in which the different worries appeared in combination. In the control condition participants were informed about basic learning strategies as writing a to-do list or finding a quiet place to learn. Participants ($N = 553$, $F = 436$, Freshmen = 126) were students with various majors (STEM = 106, teacher = 155, other = 292) from the most selective and prestigious Hungarian public university. Students were recruited from a university participant pool. We obtained the grades of the students directly from the university administrative system.

We found no significant effect of the intervention on the grades. Interestingly, students who studied to become teachers benefited less from the intervention than the other students. Participants who did not study to become teachers ($n = 398$) — having a more limited knowledge about academic difficulties, pedagogical theories, and practices — the intervention led to improved grades ($p = .034$).

Furthermore, we found significant improvement in psychological variables, such as the mindset beliefs (immediately after the intervention and controlled for pre-measures): intelligence ($p < .001$, $d = 0.19$), stress ($p < .001$, $d = 0.35$), and time pressure ($p < .001$, $d = 0.25$). It appears that the intervention successfully transformed the quality of the two most salient worries (stress and time pressure) in this group and it also changed their beliefs about their intelligence. The intervention did not reduce belonging uncertainty in general, but the interaction between the treatment and minority status ($p < .001$, $d = 1.39$) or STEM major ($p = .002$, $d = 0.51$) was significant. After

controlling for pre-intervention stereotype threat, the interaction of treatment and minority status was also significant ($p < .001$, $d = 1.52$). However, neither the interaction between the treatment and STEM, nor the three-way interaction of treatment, gender, and STEM major was significant. The intervention did not change the prosocial (proximal or distal) or self-oriented (intrinsic or extrinsic) learning goals, perceived authenticity, the perceived care (broad regard) of the teachers, or self-regulated learning.

Publications

Submitted

Orosz, G., Walton, G., Bothe, B., Toth-Kiraly, I., Henderson, A., Dweck, C. (submitted). Can Mindfulness Help People Implement a Growth Mindset? Two Field Experiments in Hungary.

Nagy, T., Sik, K., Torok, L., Bothe, B., Takacs, Z. K., Orosz, G. (submitted). Brief growth mindset and mindfulness inductions to facilitate effort after negative feedback.

2021

Salamon, J., Blume, B. D., Orosz, G., & Nagy, T. (2021). The interplay between the level of voluntary participation and supervisor support on trainee motivation and transfer. *Human Resource Development Quarterly*, *hrdq.21428*. <https://doi.org/10.1002/hrdq.21428>

Salamon, J., Tóth-Király, I., Bőthe, B., Nagy, T., & Orosz, G. (2021). Having the Cake and Eating It Too: First-Order, Second-Order and Bifactor Representations of Work Engagement. *Frontiers in Psychology*, *12*, 3030. <https://doi.org/10.3389/fpsyg.2021.615581>

2020

Gál, É., Tóth-Király, I., Szamosközi, I., & Orosz, G. (2020). Fixed intelligence mindset moderates the impact of adverse academic experiences on students' self-esteem. *Journal of College Student Retention: Research, Theory & Practice*, *152102512096132*. <https://doi.org/10.1177/1521025120961322>

Tóth-Király, I., Amoura, C., Bőthe, B., Orosz, G., & Rigó, A. (2020). Predictors and outcomes of core and peripheral sport motivation profiles: A person-centered study. *Journal of Sports Sciences*, *38*(8), 897–909. <https://doi.org/10.1080/02640414.2020.1736765>

Tóth-Király, I., Morin, A. J. S., Gillet, N., Bőthe, B., Nadon, L., Rigó, A., & Orosz, G. (2020). Refining the assessment of need supportive and need thwarting interpersonal behaviors using the bifactor

exploratory structural equation modeling framework. *Current Psychology*.

<https://doi.org/10.1007/s12144-020-00828-8>

2019

Tóth-Király, I., Beáta Bőthe, Márki, A. N., Rigó, A., & Orosz, G. (2019). Two sides of the same coin: The differentiating role of need satisfaction and frustration in passion for screen-based activities.

European Journal of Social Psychology, 49(6), 1190–1205. <https://doi.org/10.1002/ejsp.2588>

Tóth-Király, I., Bőthe, B., Orosz, G., & Rigó, A. (2019). A New Look on the Representation and Criterion Validity of Need Fulfillment: Application of the Bifactor Exploratory Structural Equation Modeling Framework. *Journal of Happiness Studies*, 20(5), 1609–1626.

<https://doi.org/10.1007/s10902-018-0015-y>

2018

Orosz, G., Tóth-Király, I., Büki, N., Ivaskevics, K., Bőthe, B., & Fülöp, M. (2018). The Four Faces of Competition: The Development of the Multidimensional Competitive Orientation Inventory. *Frontiers in Psychology*, 9, 779. <https://doi.org/10.3389/fpsyg.2018.00779>

Tóth-Király, I., Morin, A. J. S., Bőthe, B., Orosz, G., & Rigó, A. (2018). Investigating the Multidimensionality of Need Fulfillment: A Bifactor Exploratory Structural Equation Modeling Representation. *Structural Equation Modeling: A Multidisciplinary Journal*, 25(2), 267–286.

<https://doi.org/10.1080/10705511.2017.1374867>

2017

Tóth-Király, I., Bőthe, B., Rigó, A., & Orosz, G. (2017). An Illustration of the Exploratory Structural Equation Modeling (ESEM) Framework on the Passion Scale. *Frontiers in Psychology*, 8, 1968.

<https://doi.org/10.3389/fpsyg.2017.01968>