

**DOCTORAL SCHOOL OF EDUCATION
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**MASTERY MOTIVATION AND SUBJECT-SPECIFIC MASTERY MOTIVATION IN
MIDDLE-SCHOOL STUDENTS: CROSS CULTURAL STUDY IN HUNGARY AND
MOLDOVA**

DOCTORAL DISSERTATION SUMMARY

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Introduction

Affective factors such as anxiety (Du et al., 2021; Fréchette-Simard et al., 2023; Henschel & Roick, 2017; Steinmayr et al., 2018), well-being (Holzer et al., 2022; Mendoza & Yan, 2023; Steinmayr et al., 2018), self-efficacy (Usher et al., 2019) and interest (Lee et al., 2014) were found to explain the academic outcomes in a variety of recent research in middle school students. Accordingly, educators and researchers have increasingly focused their attention on these factors. Motivation, as a significant affective factor, contributes to the cognitive, social, and motor development of children across various age groups and is correlated with students' academic performance, curiosity and persistence (Camacho-Morles et al., 2021; Collie & Martin, 2019; Lazowski & Hulleman, 2016). Shankoff and Philips (2000) stated that it is critical to consider the assessment of mastery motivation as a pivotal factor in child development (Shankoff & Phillips, 2000).

George Morgan using the theoretical developments of Robert White and Leon J. Yarrow defined mastery motivations as a multidimensional, intrinsic and psychological drive that compels an individual to try independently and persistently to achieve a task of moderate difficulty, solve a problem or master a skill or outcome (Morgan et al., 1990; White, 1959; Yarrow et al., 1975). Mastery motivation is considered multifaced, attributable to the context that it can be employed (educational, domestic or social environments), due to the developments domains it consists of and its two principal aspects (Busch-Rossnagel & Morgan, 2013; Wang & Barrett, 2013).

The two overarching aspects of mastery motivation are the instrumental and affective/expressive aspects. Affective aspects of mastery motivation includes both stimulating emotions like pleasure and interest, which encourage individual's persistence in mastering challenges, and demotivating feelings such as sadness and shame, which can lead to withdrawal and abandonment of efforts in overcoming challenging in a mastery activity (Barrett & Morgan, 2018; Calchei et al., 2020). Whereas instrumental aspect refers to an individual's focus persistence, control, and attempt during a mastery activity. The domains of instrumental aspect: object/cognitive mastery motivation, social mastery motivation, and gross motor mastery motivation and the one of the expressive aspects are mastery pleasure and negative reactions.

Within research on mastery motivation in the educational context there are studies on subject-specific mastery motivation that was founded on the hypothesis that mastery motivation is subject specific therefore a more contextualized measurement of mastery motivation can increase the predictiveness of school achievement compared with the domain general mastery motivation assessment instrument (Hornstra et al., 2016; Józsa, 2014; Józsa et al., 2017; Wigfield, 1997). Therefore, the specificity of mastery motivation is considerably shaped by the students' educational experience, the pedagogical strategies implemented on the national and school levels (Lazowski & Hulleman, 2016). Subject-specific mastery motivation was developed on the foundation of cognitive persistence and mastery pleasure domains of mastery motivation. The theoretical explanation of using cognitive persistence lies on an individual's inherent drive to endure and excel in the face of challenges while striving to master a diverse range of cognitive and educational tasks (Ackerman & Lohman,

2006; Rammstedt, 2018; Teubner-Rhodes, 2020; Teubner-Rhodes et al., 2017). Besides, performance depends not solely on an individual's cognitive abilities but also on their persistence to succeed and the effort they invest in mastering a task. As for the mastery pleasure domain it is operationalized that emotions play an important role: they can encourage an individual to either preserve or disengage with a mastery situation or task. (Rash et al., 2016). Besides, emotions of a variety of valences arise in situations that involve pursuit of mastery or success (Barrett, 1998; Harley et al., 2019; Józsa & Barrett, 2018). Subject-specific mastery motivation is measured within seven subjects/domains: reading, mathematics, science, English as a foreign language, German as a foreign language, art and music.

Indisputably, culture has an impact on motivation in an educational context and consequently triggers cultural differences and variations (within- and between-countries) in motivation. As Deci and Ryan posited, human beings possess an inherent disposition towards incorporating cultural behaviors and values encountered during their development (Ryan & Deci, 2009). This implies that individuals fully internalize their inherited culture.

There have been several studies that explored the similarities and differences in mastery motivation domains across cultures (Gilmore et al., 2017; Hwang et al., 2017; Józsa et al., 2020). These studies defined culture as “country”, though cultural differences are present within certain countries. Cross-cultural studies on affective factors are very often focused on contrasting Asian and Western nations therefore the identified variations were attributed to the dichotomy of individualism/collectivism of Asian versus Western countries or to the structure of the educational system (Morgan et al., 2013). Nevertheless, research examining the influence of ethnicity within countries is scarce, specifically outside the U.S., where uniformity in educational systems cannot be presumed due to its state based-government educational system. Within the Moldovan context, it is possible to determine if the cultural factors play a role in differences in mastery motivation given that the educational system in schools with Romanian and Russian language of instruction is identical.

Besides, we attempted to carry out a cross cultural study of subject specific mastery motivation between Hungary and the Republic of Moldova. And due to the fact that the social organization of these two countries are similar we adopted the perspective of cultural values based on Hofstede’s 6-D cultural map models to identify the cultural difference between these countries (Hofstede, 2001, 2018).

The focus of this research project is to explore mastery motivation and subject-specific mastery motivation within the Moldovan context and the cross-cultural analysis of subject-specific mastery motivation in middle school student from Hungary and the Republic of Moldova. Notably, in the Republic of Moldova there are no empirical studies on motivation of middle school students using advanced statistical methods. Middle-school students encompass a particularly significant age group to be studied as this cohort of students are enrolled in compulsory education and after middle school students begin to navigate through a variety of education and career options available in Moldova.

Present Study

Despite there being empirical studies on mastery motivation there exists a gap in further exploration of its measurement instrument both of the general domain of mastery motivation: Dimensions of Mastery Questionnaire (DMQ 18) (Morgan et al., 2020) and specific domains of mastery motivation: Subject-Specific Mastery Motivation Questionnaire (SSMMQ) (Józsa et al., 2017) and to explore its stability in other cultures. Moreover, there is a need to explore the levels of mastery motivation in Moldova and its trajectory in schools with Romanian language of instruction and schools with Russian language of instruction as the culture of the students and teachers and the school culture might have influence students' mastery motivation. And though we do not investigate the influence of culture on these two categories of students in the Republic of Moldova, we explore its trajectory.

Besides, despite existing literature on the predictive power of mastery motivation, research on the predictive value of subject-specific mastery motion and mastery motivation in specific subjects remains unexplored (Józsa et al., 2020; Józsa & Barrett, 2018). This study, therefore, intends to fill these research gap, contributing to the broader understanding of how mastery motivation functions across different domains and cultural educational settings. This last problem has not yet been published at the moment of the submission of this paper.

In response to the stated problem, this study-based dissertation aims to explore mastery motivation as a general domain and specific domain in Hungary and the Republic of Moldova.

Accordingly, this dissertation aims to (a) to adapt DMQ 18 and SSMMQ into Russian and Romanian and analysis of the psychometric properties of these versions of student self-rated; (b) to analyze the differences of mastery motivation and subject-specific mastery motivation levels across languages, grade levels, and gender in the Moldovan context; (c) to investigate the cross-cultural differences in subject specific mastery motivation levels in Hungary and the Republic of Moldova.

Instruments

Mastery motivation was measured using Dimensions of Mastery Questionnaire in Romanian and Russian languages. DMQ 18 consists of 7 scales and 41 five-level Likert items, each rated from not at all typical (1) to very typical (5). The instrumental aspect of mastery motivation contains four scales: Cognitive/Object Persistence (COP) (six items), Gross Motor Persistence (GMP) (five items), Social Persistence with Adults (SPA) (six items), and Social Persistence with Children (SPC) (six items). The expressive aspect of mastery motivation includes two scales: Mastery Pleasure (MP) (five items) and Negative Reactions to Challenge (NRC) (eight items). Finally, the General Competence scale (COM) (five items) measures the perceived ability to master a skill and is a measure of a potential influence on mastery motivation, rather than mastery motivation itself. The Negative Reactions to Challenge (NRC) scale is divided into two subscales: the frustration/anger subscale containing four items and the sadness/shame subscale consisting of a similar number of items.

Subject-specific mastery motivation was measured using Subject Specific Mastery Motivation Questionnaire. SSMMQ contains the following scales: Reading Mastery Motivation (Reading), Mathematics Mastery Motivation (Math), Science Mastery Motivation (Science), Music Mastery Motivation (Music), Art Mastery Motivation (Art), English as a

Foreign Language Mastery Motivation (English), and School Mastery Pleasure (SMP). Each scale consists of six 5-point Likert items. The scales do not consist of parallel items.

Methodology

To conduct the cross-sectional, quantitative investigation, a survey technique was applied. This study-based doctoral dissertation is based on three samples collected in two different phases. In the first phase, the data was collected with the aim to validate DMQ18 and trial the data collection procedures in the Moldovan educational context. The validation study of the Romanian and Russian versions of DMQ18 and the cross-ethnic study included 275 fifth-grade students receiving instruction either in Russian (162) or Romanian (113). The inclusion criterion that was used was that the students were enrolled in the relevant grade, i.e., fifth grade. The students were selected from schools that belonged to the same school district in the Republic of Moldova and were academically comparable based on the exam results that are made public every year.

In the second phase the data was collected in the Hungary and the Republic of Moldova. The data from this sample was used to publish the validation study of SSMMQ and compare subject-specific mastery motivation levels of Moldovan students studying in Romanian or Russian languages as well as for the cross-cultural study between Hungary and Moldova. The sample comprises 939 (472 girls and 466 boys) secondary school students from five public schools in a large city in the Republic of Moldova. The response rate within schools in this study was 90.70%. Two linguistically different samples were used: the Romanian (RO) sample consisting of the students who studied in schools with the Romanian language of instruction ($N_{RO} = 586$ (62.407%)) and the Russian (RU) sample corresponding to the students studying in schools with the Russian language of instruction ($N_{RU} = 353$ (37.593%)). Moreover, the distribution across grade levels was the following: 346 (36.848%) studied in the fifth grade ($N_{RO, 5} = 219$ and $N_{RU, 5} = 127$), 304 (32.375%) studied in the seventh grade ($N_{RO, 7} = 199$ and $N_{RU, 7} = 105$ Russian), and 289 (30.777%) were in the ninth grade ($N_{RO, 9} = 168$ and $N_{RU, 9} = 121$).

The Hungarian (HU) sample consisted of 1121 Hungarian students. Across the Hungarian sample, 484 (43.175%) were fifth graders, 375 (33.452%) were seventh graders, and 262 (23.371%) were ninth graders.

The data was collected using paper and pen procedure. The researcher was present during data collection phases in the Republic of Moldova, while in Hungary an educator familiar with mastery motivation frameworks and the SSMMQ facilitated the data collection process. The analytical procedures used in the empirical studies included CFA, measurement invariance, latent means difference, ANOVA, MANOVA. In our studies we used IBM SPSS Statistics 23.0 and Amos 28.0 and 29.0.

Results

When validating the Romanian and Russian version of DMQ18 we tested as the baseline model the five-factor first-order and five-factor second-order factor model using CFA. Importantly, the NRC and COM were not part of the models as the NRC items are usually not included in DMQ 18 factor analyses when there are limited sample sizes, given that their relatively lower internal consistency besides COM items are usually not included because they do not measure mastery motivation. This first stage of the study is a prerequisite for establishing the whole data baseline model that must fit separately the group data sets. In

our study, we started with the Romanian-speaking data set as it was the smallest and the small sample size could have caused model fit issues. The result of the CFA analysis concluded that the model fit of the Romanian-speaking data set was acceptable.

Measurement invariance is a compulsory condition for comparison of latent means in cross-cultural studies. This analysis is not common within mastery motivation research. It was used in few recent studies on a preschool sample and school-aged children in across-country analysis (Hwang et al., 2017). This was the first study in which measurement invariance is used to establish appropriateness of questionnaires using different languages to measure mastery motivation within a single country. The configural and metric invariance of the data set was achieved. This provided evidence that the first-order factor structure of the DMQ18 supported the inference that items and scales had equivalent meaning to participants across the Romanian- and Russian-speaking groups, and the items used to measure the underlying factors of the DMQ18 were equivalently associated with the latent variables for both ethnic groups.

Finally, an important contribution of the present study is the investigation of ethnic differences in mastery motivation in a country where the educational system provides complete instruction in two different languages to fit the needs of most of the population. Thus, addressing the last aim of the present research related to the differences between the perceptions of mastery motivation of Russian-speaking students and Romanian-speaking students in the Moldovan context, we determined that the 5th graders rate themselves similarly on the COP, SPC, SPA and MP scale. On the GMP scale, the Romanian-speaking students rated themselves significantly higher than the Russian-speaking students with a very large effect size (Calchei et al., 2023).

When comparing the self-ratings of mastery motivation of the Russian and Romanian-speaking students only one difference was identified, on GMP, where the Romanian-speaking students rated themselves higher than the Russian-speaking students. These findings both support the comparability of the Russian and Romanian language versions of the DMQ18 and the similarity in perceived motivation across these ethnic groups in Moldova. This finding is in line with the results of cross-cultural comparisons of Hungarian-, Chinese-, and English-speaking school-aged children who determine a difference on the same scale on which the English and Hungarian-speaking students rated themselves statistically significantly higher than the Chinese-speaking students.

This study's limitation to fifth grade students suggests the need to include cross-ethnic studies of mastery motivation at various stages of school evaluation to determine the possible impact of ethnicity at different ages and levels of schooling. Such results could inform interventions to support student's mastery motivation and subsequently their academic achievement (Józsa & Barrett, 2018; Vansteenkiste et al., 2014). This is supported by the established evidence that mastery motivation is a predictor of school achievement (Hashmi et al., 2017; Józsa & Molnár, 2013). However, it is also important to determine to what extent the ethnicity of the student and language of the educational system explain variation in mastery motivation within one educational system (Józsa et al., 2020).

The current study aimed to explore the factor structure of the Romanian and Russian versions of the SSMMQ in a sample of fifth, seventh, and ninth graders from the Republic of Moldova. For this purpose, we tested three models of the SSMMQ: the first one was the initial seven-factor model of the SSMMQ that was put forward by Józsa et al (Józsa et al., 2017). This model that included the subject specific scales (Rading, Math, Science, English,

Art and Music) and SMP did not produce an acceptable fitness of good in both versions. Given the fact that the school mastery pleasure items had the lowest factor loadings and that each of its items measured the mastery pleasure in the specific subjects comprised in the SSMMQ, we included these items in the subject-specific scales for being the second tested model. The last model of the SSMMQ in Romanian and Russian included only the six subject-specific scales (six items per scale) and all the items assessing school mastery pleasure were excluded; it yielded the best goodness of fit indices and good internal consistency values across all samples.

The variables of school-specific mastery pleasure in the original study cross-loaded above 0.400 on the corresponding subject-specific mastery scale (English, Science, Art, and Music) and school-specific mastery pleasure scale. We consider that an item of SMP can be dropped only if the whole related school domain scale is dropped. Otherwise, the drop of an SMP item related to a scale used in the questionnaire violates the construction of the construct of subject-specific mastery motivation. SMP is an affective scale that measures the expressive aspect during or right after mastering subject-specific tasks, which is similar to the Mastery Pleasure scale in DMQ 18. The items assessing mastery pleasure in the DMQ 18 are worded diversely while the items evaluating school subject mastery motivation in the SSMMQ are worded in parallel. Parallel wording in scales can cause misfits or inadequate fit and biased outcomes (Gliner et al., 2017). To our knowledge, there is no statistical solution for scales that are composed of items with parallel wording. We hypothesize that the subject-specific mastery pleasure items would be varied to express “smiling, laughing or other behavioral indicators of positive affect” during or after mastering tasks in the evaluated subjects.

The complexity of this study resides in the inclusion of three criteria in defining groups: language (Romanian and Russian), grade (five, seven and nine) and gender), resulting in the use of seven different groups in the statistical analysis. This complexity motivated the adoption of a sequential approach to defining the baseline model for further measurement invariance. The correlated errors imposed on the final baseline model were selected on the criteria of being present in all the groups to avoid accidental deflation or inflation of statistical outcomes.

In this study, we also aimed to assess group-level differences in subject-specific mastery motivation. In the studied sample, the means of girls were higher than those of boys. Thus, there is a statistically significant difference in means in Science and English mastery motivation, whereas in Art, Music, and Reading, the difference was a medium. There was no gender difference in the level of Math mastery motivation. Gender differences have rarely been examined within the theory of mastery motivation. The only study that focused on these differences used the Dimensions of Adult Mastery Motivation Questionnaire that investigated mastery motivation levels in university students (Józsa et al., 2020). This study found that there was a lack of gender differences in Hungarian students, but the Australian, Bangladeshi, and Iranian female students reported significantly lower levels of mastery motivation.

What is more, the lack of gender differences in Math mastery motivation is in disagreement with studies that investigated motivation at school and concluded that secondary school girls (as compared with boys) have lower mastery motivation in Western countries (Hui & Triandis, 1985). At the same time, there are several studies that have identified that boys reported lower academic or domain-specific motivation than girls in Belgium, Russia, Azerbaijan, Australia, and the US (Han, 2019; Karimova & Csapó, 2021;

Watt, 2016). In light of the new emergent gender roles, the gender differences in subject-specific mastery motivation can explain the academic fluctuations of the students. Nevertheless, the gender differences may be age- or grade- related as, at the university level, there are no differences between males and females on the total mastery motivation and on the scales of Dimensions of Adult Mastery Motivation Questionnaire College (Bruick, 2019).

Although the students studying in the Romanian language had higher latent means of Music, Science, Art, and Science mastery motivation, the size effect of these differences are below 0.200, therefore they are negligible. Thus, there was no statistically significant difference between the latent means of the students receiving education in the Romanian language and those studying in Russian.

Findings also showed latent mean difference across seventh graders had a lower Music, Art, and Math mastery motivation in comparison with fifth graders. Moreover, the ninth graders exhibited statistically and significantly lower mastery motivation in Art and English, whereas the latent mean comparison of fifth- and ninth-grade students revealed more differences, namely in Music, Art, English, Math, and Science mastery motivation, with the ninth graders having lower latent means. All identified latent differences had a small effect. One subject-specific mastery motivation level that remained stable across the grades was Reading. Art mastery motivation constantly decreased across the grades. English is the subject-specific mastery motivation that starts decreasing more significantly in the seventh grade, continuing towards the ninth grade. Music, Math, and Science mastery motivation decrease gradually but it is identified only in ninth graders and not in seventh graders. Some of the grade level changes found in this study correspond with the previous studies examining subject mastery motivation in Hungary and Taiwan. The Art, Science, and Math mastery motivation of the students from Hungary are similar with the ones from the Republic of Moldova and decreased across the grades with a similarly small effect size. English as a foreign language did not decrease in either Hungary or Taiwan at the secondary school level, whereas it did in Moldova, just like mastery motivation in all other subjects under investigation. Only in the Republic of Moldova was Reading mastery motivation level stable across the grades, which is opposite to the findings of the previous research. In Hungary, the English mastery motivation level tends to drop from the fourth to the sixth grade, but later on it becomes stabilized. Furthermore, the outcomes of the current study support the conclusions that the cognitive persistence domain of mastery motivation tends to decline in students from grade four to grade eight (Józsa et al., 2020).

Regarding the mean difference within the grades in each country, we found that in Hungary, Reading, Math, Science, Art, and Music decreased significantly between grades five and seven. These findings are consistent with a previous study of subject-specific mastery motivation in this country that concluded that these levels decreased between grades four and eight. The findings are corroborated by a body of empirical evidence derived from cross-sectional investigations on mastery motivation among school students in Hungary (Józsa et al., 2014; Józsa & Molnár, 2013). As for the trajectory of the subject-specific mastery motivation between grades seven and nine in the Hungarian sample, the data showed that the levels remained significantly stable, which is in line with a previous empirical study, with the exception of the Art and Music scales, where the students' mastery motivation constantly increased from grades four to ten (Józsa et al., 2017). As for English, the result of the present study differed as we did not find the change to be significant, whereas previous

studies determined a decrease in the level of English mastery motivation from grades four to six and then a stagnation up to grade 10.

In the Moldovan sample, significant differences were registered on the Math, Music, and Art scales. As in the Hungarian sample, the levels in these subjects declined from the fifth to the seventh grade, but in the ninth grade, the Math and Music remained stable, while Art continued declining. Since we decided on the use of stringent alpha in the analysis of variance between grades as a result of the violations of the assumption of this statistical test, the changes in Science and English are not considered significant. As for the domain of Reading, students' subject-specific mastery motivation level in this particular subject remained relatively consistent and was not found to undergo significant fluctuations during the middle school years in Moldova.

When making a comparison of the means between the two countries, our conclusion was that, solely on the Science scale, the Moldovan students consistently rated themselves higher than their Hungarian counterparts. Moreover, it was specifically this scale that exhibited a significant difference between the countries, whereas the remaining scales did not register any statistically significant variations. Thus, the Moldovan students displayed a higher motivation to study Science.

There were no significant multivariate effects for students from all the grades in both countries on the Science, Music, and Art scales. However, the interaction effect between grade and country was significant on the Reading, Math, and English scales; it seems that the Hungarian students' means in Reading and Math dropped between fifth and seventh grade, whereas the Moldovan students tended to have a stable mastery motivation in Reading between these grades, while their trend in motivation in respect to obstacles in Math followed the Hungarian one.

When embarking on this study, we anticipated that the overall trajectory of the levels of mastery motivation in particular disciplines would exhibit a downward trend. This decline in motivation and subject/domain-specific motivation over ages/grades was empirically established by a range of motivation frameworks (Jacobs et al., 2002; Lepper et al., 2005; Liou et al., 2021). This trajectory has been explained through developmental and educational settings and curriculum perspectives. Hence, in approaching it from a developmental standpoint, this decline can be attributed to the optimistic orientation of younger students who perceive their own motivation as high (Bouffard et al., 1998). Moreover, the older students become, the more opportunities for social comparison they get, and therefore, students' self-rating of the mastery motive becomes more objective and thus falls. In addition, another fact that can influence this progression of motivation is change in the educational setting, such as change of schools (elementary school to middle school) or teachers (Wigfield et al., 2004). Students in higher grades pursue academic achievement, thus deemphasizing learning, which may have adverse effects on student motivation (Jacobs et al., 2002). Furthermore, as students make headway through their educational path, the curriculum gradually becomes more challenging and less relevant to real-world contexts, which can negatively impact motivation (Lepper et al., 2005). The cultural aspects of students are mainly identified in studies that compare the motivation of students from Asian countries with students from Western countries (Gilmore & Cuskelly, 2017; Morgan et al., 2019).

Our study concludes that subject-specific mastery motivation tends to decline until grade seven and becomes stable at grade nine. The lack of change in the trajectory between these two grades can be explained in Moldova by the high-stakes compulsory exams in native

language and literature and mathematics at the end of the ninth grade. Students are not assessed in science at this point, and therefore, we see a downfall trajectory in Science mastery motivation.

Given the cultural differences identified between the Hungarian and Moldovan cultures on Hofstede's cultural dimensions, we expected more significant mean differences between middle school students in these countries. Nonetheless, our empirical investigation did not identify major differences. In order to elucidate the absence of variations within the realm of subject-specific mastery motivation in the specific context of Hungary and Moldova, it is imperative to ascertain the specific domains encompassed by the cultural frameworks employed in this study that encompass the concept of persistence, which serves as the fundamental cornerstone underpinning the theoretical framework of mastery motivation theory. Hofstede's cultural dimensions do not explicitly incorporate persistence as a distinct cultural domain or include it within its predefined domains. Nevertheless, we consider that two dimensions in Hofstede's 6-D model of cultural values, namely, long-term orientation and uncertainty avoidance, might be indirectly related to the motivational concept of persistence. Thus, the tendency to display uncertainty avoidance indicates a society's preference for rules and predictability. Consequently, this cultural domain can support persistence when facing challenges. The long-term orientation dimension reflects a society's orientation toward either short-term or long-term goals, thus emphasizing persistence and perseverance as means of mastering goals. In these two domains, the observed differences between Hungary and Moldova are minimal, including in the indulgence cultural domain. One plausible hypothesis could be posited to explain the absence of significant mean differences in subject-specific mastery motivation between Hungary and Moldova based on their proximity in the dimensions of long-term orientation and uncertainty avoidance. The relatively similar positions of these two countries along these cultural dimensions may contribute to the observed lack of divergence in subject-specific mastery motivation scores (Calchei et al., 2024).

The present cross-cultural study contributes to the debate on measuring motivation in various cultures or ethnic groups. This issue is prompted by the cultural meanings associated with the motivational construct, which can lead to difficulties in comparing means (Pintrich, 2003). Researchers tend to consider that within-country comparisons are more reliable as the potential differences are less influenced by cultural, social, and educational system structural aspects (Artelt, 2010). The study of subject-specific mastery motivation across two cultures that are geographically closely situated and share some political characteristics in their history is important for practitioners as it can highlight the potential differences between cultures that contribute to the achievement of academic success. Moreover, it can elucidate the role of culture in the variation of mastery motivation in cultures that share values. However, there is a need to concurrently assess the predictive power of the achievement of its domains and other school-related outcomes (such as time spent on mastering a challenging task or competence), for it can be a subject of cultural variations.

If we compare the results delivered by DMQ18 and SSMMQ, we can state that it is SSMMQ delivered more differences between students receiving instruction in Romanian and students receiving instruction in Russian language, mostly since it measures mastery motivation in a narrow educational context.

Conclusions

The findings can be concluded that both Romanian and Russian versions of DMQ18 and SSMMQ can be used in the Moldovan educational context. Beside the difference between the levels of mastery motivation and subject specific mastery motivation in the students receiving instruction either in Romanian or Russian languages in the Republic of Moldova is not significant therefore the data can be used as merged and used in cross-cultural studies. The findings indicated that subject-specific mastery motivation (SSMM) domains in Hungary and Moldova have different paths across grade levels. In Hungary, there was a constant decreasing trajectory across all grades in all domains except for English, whereas in Moldova, the decrease was identified in Math, English, Music, and Art between the fifth and the seventh grades but not between the seventh and the ninth grades, while Reading mastery motivation levels remained stable. The comparative analysis of Hungarian and Moldovan students' subject-specific mastery motivation revealed significant differences in their science mastery motivation. Specifically, Hungarian students self-reported a higher level of Science mastery motivation than their Moldovan one.

Despite the several strengths of the study, we acknowledge the presence of certain limitations. First, the study used convenient sampling rather than random sampling due to the privacy laws imposed both in Hungary and Moldova. Next, the cross-sectional study design did not allow to study the individual changes in subject-specific mastery motivation and mastery motivation. Therefore, it is important to adopt a longitudinal design for researching the developmental trajectories and individual dynamics of mastery motivation and subject-specific mastery motivation. Third, the students rated themselves, and most students prefer to rate themselves higher, especially in the case of younger students. Therefore, further examinations of measurement and structural equivalence across additional grade cohorts and cultures are required.

As a series of studies demonstrated the role of teachers and parents in motivating students and increasing it and even improving students' academic achievement (Brandmiller et al., 2020; Friedrich et al., 2015; Givvin et al., 2001; Liu, 2021; Peng, 2021; Rogers et al., 2009; Tandler & Dalbert, 2020). Therefore, one of the future directions that is important to adopt in research on mastery motivation is examining the agreement and consistency of teachers' and parents' perception of students' levels of mastery motivation, understanding how these perceptions correlate and assessing their power to predict academic achievement, especially in comparison with student's self-assessment of their mastery motivation levels. Such studies can explain the assistance teachers require to enhance their diagnostic skills in mastery motivation and subjects-specific mastery motion and what is more (Hashmi et al., 2017).

Furthermore, in all research on mastery motivation and subject-specific mastery motivation the scholars adopted the variable-centered approach that focused on studying the relations among variables. We consider that adopting person-centered approach could bring new insight into the theory of mastery motivation and, importantly, enhance its applicability for educators and parents.

References

- Ackerman, P. L., & Lohman, D. F. (2006). Individual differences in cognitive functions. In P. L. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology*. (pp. 139–161). Lawrence Erlbaum Associates Publishers.

- Artelt, C. (2010). Cross-cultural approaches to measuring motivation. *Educational Assessment, 10*(3), 231–255. https://doi.org/10.1207/S15326977EA1003_5
- Barrett, K. C. (1998). A functionalist perspective to the development of emotions. In M. F. Mascolo & S. Griffin (Eds.), *What develops in emotional development?* (pp. 109–133). Plenum Press. https://doi.org/10.1007/978-1-4899-1939-7_5
- Barrett, K. C., & Morgan, G. A. (2018). Mastery motivation: Retrospect, present, and future directions. In A. J. Elliot (Ed.), *Advances in Motivation Science* (pp. 1–39). Elsevier Academic Press. <https://doi.org/10.1016/bs.adms.2018.01.002>
- Brandmiller, C., Dumont, H., & Becker, M. (2020). Teacher perceptions of learning motivation and classroom behavior: The role of student characteristics. *Contemporary Educational Psychology, 63*, 101893. <https://doi.org/10.1016/j.cedpsych.2020.101893>
- Bruick, T. J. (2019). *Mastery motivation: Moving towards a better understanding of college student success* [Colorado State University]. <https://api.mountainscholar.org/server/api/core/bitstreams/fc3add23-3451-4501-ad1c-ee4b7742878c/content>
- Busch-Rossnagel, N. A., & Morgan, G. A. (2013). Introduction to section three (mastery motivation and self-regulation): Overview and analysis. In K. C. Barrett, N. A. Fox, G. A. Morgan, D. J. Fidler, & L. A. Daunhauer (Eds.), *Handbook of self-regulatory processes in development: new directions and international perspectives* (pp. 247–264). Psychology Press.
- Calchei, M., Amukune, S., & Józsa, K. (2024). Comparing subject-specific mastery motivation in Hungary and the Republic of Moldova. *Frontiers in Education, 8*. <https://doi.org/10.3389/educ.2023.1259391>
- Calchei, M., Barrett, K. C., Józsa, K., & Amukune, S. (2020). Comparative study of Russian- and Romanian-speaking students' mastery motivation in the Republic of Moldova. *Cogent Education, 9*(1). <https://doi.org/10.1080/2331186X.2022.2143039>
- Calchei, M., Oo, T. Z., & Józsa, K. (2023). Subject specific mastery motivation in Moldovan middle school students. *Behavioral Sciences, 13*(2), 166. <https://doi.org/10.3390/bs13020166>
- Camacho-Morles, J., Slemp, G. R., Pekrun, R., Loderer, K., Hou, H., & Oades, L. G. (2021). Activity achievement emotions and academic performance: A meta-analysis. *Educational Psychology Review, 33*(3), 1051–1095. <https://doi.org/10.1007/S10648-020-09585-3/FIGURES/3>
- Collie, R. J., & Martin, A. J. (2019). Motivation and engagement in learning. In Zhang L. (Ed.), *Oxford Research Encyclopedia of Education*. Oxford University Press. <https://doi.org/10.1093/acrefore/9780190264093.013.891>
- Du, C., Qin, K., Wang, Y., & Xin, T. (2021). Mathematics interest, anxiety, self-efficacy and achievement: Examining reciprocal relations. *Learning and Individual Differences, 91*, 102060. <https://doi.org/10.1016/J.LINDIF.2021.102060>

- Fréchette-Simard, C., Plante, I., Duchesne, S., & Chaffee, K. E. (2023). A latent growth analysis of individual factors predicting test anxiety during the transition from elementary to secondary school. *Journal of Early Adolescence*, 43(3), 265–293. https://doi.org/10.1177/02724316221104198/SUPPL_FILE/SJ-PDF-1-JEA-10.1177_02724316221104198.PDF
- Friedrich, A., Flunger, B., Nagengast, B., Jonkmann, K., & Trautwein, U. (2015). Pygmalion effects in the classroom: Teacher expectancy effects on students' math achievement. *Contemporary Educational Psychology*, 41, 1–12. <https://doi.org/10.1016/J.CEDPSYCH.2014.10.006>
- Gilmore, L., & Cuskelly, M. (2017). Associations of child and adolescent mastery motivation and self-regulation with adult outcomes: A longitudinal study of individuals with Down syndrome. *American Journal on Intellectual and Developmental Disabilities*, 122(3), 235–246. <https://doi.org/10.1352/1944-7558-122.3.235>
- Gilmore, L., Islam, S., Younesian, S., Bús, E., & Józsa, K. (2017). Mastery motivation of university students in Australia, Hungary, Bangladesh and Iran. *Hungarian Educational Research Journal*, 7(2), 178–191. <https://doi.org/10.14413/HERJ/7/2/11>
- Givvin, K. B., Stipek, D. J., Salmon, J. M., & MacGyvers, V. L. (2001). In the eyes of the beholder: students' and teachers' judgments of students' motivation. *Teaching and Teacher Education*, 17(3), 321–331. [https://doi.org/10.1016/S0742-051X\(00\)00060-3](https://doi.org/10.1016/S0742-051X(00)00060-3)
- Gliner, J. A., Morgan, G. A., & Leech, N. L. (2017). *Research methods in applied settings: An integrated approach to design and analysis* (3rd ed.). Routledge. <https://doi.org/10.4324/9781315723082>
- Han, F. (2019). Self-concept and achievement in math among Australian primary students: Gender and culture issues. *Frontiers in Psychology*, 10:603. <https://doi.org/10.3389/fpsyg.2019.00603>
- Harley, J. M., Pekrun, R., Taxer, J. L., & Gross, J. J. (2019). Emotion regulation in achievement situations: An integrated model. *Educational Psychologist*, 54(2), 106–126. <https://doi.org/10.1080/00461520.2019.1587297>
- Hashmi, S. I., Seok, C. B., & Halik, M. H. (2017). Enhancing persistence on mastery tasks among young preschool children by implementing the “I Can” mastery motivation classroom program. *Hungarian Educational Research Association*, 15(2), 127–141.
- Henschel, S., & Roick, T. (2017). Relationships of mathematics performance, control and value beliefs with cognitive and affective math anxiety. *Learning and Individual Differences*, 55, 97–107. <https://doi.org/10.1016/J.LINDIF.2017.03.009>
- Hofstede, G. (2001). *Cultures consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Sage.
- Hofstede, G. (2018). *Country comparison. Hofstede Insights*. <https://www.hofstede-insights.com/country-comparison/>
- Holzer, J., Bürger, S., Lüftenegger, M., & Schober, B. (2022). Revealing associations between students' school-related well-being, achievement goals, and academic

- achievement. *Learning and Individual Differences*, 95, 102140.
<https://doi.org/10.1016/J.LINDIF.2022.102140>
- Hornstra, L., van der Veen, I., & Peetsma, T. (2016). Domain-specificity of motivation: A longitudinal study in upper primary school. *Learning and Individual Differences*, 51, 167–178. <https://doi.org/10.1016/j.lindif.2016.08.012>
- Hui, C. H., & Triandis, H. C. (1985). Measurement in cross-cultural psychology: A review and comparison of strategies. *Journal of Cross-Cultural Psychology*, 16(2), 131–152. <https://doi.org/10.1177/0022002185016002001>
- Hwang, A. W., Wang, J., Józsa, K., Wang, P.-J., Lio, H.-F., & Morgan, G. A. (2017). Cross cultural invariance and comparisons of Hungarian-, Chinese-, and English- speaking preschool children leading to the revised Dimensions of Mastery Questionnaire (DMQ 18). *Hungarian Educational Research Journal*, 7(2), 32–47. <https://doi.org/10.14413/HERJ/7/2/3>
- Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development*, 73(2), 509–527.
- Józsa, K. (2014). Developing new scales for assessing English and German language mastery motivation. In J. Horváth & P. Medgyes (Eds.), *Studies in Honour of Marianne Nikolov* (pp. 37–50). Lingua Franca Csoport.
- Józsa, K., & Barrett, K. C. (2018). Affective and social mastery motivation in preschool as predictors of early school success: A longitudinal study. *Early Childhood Research Quarterly*, 45, 81–92. <https://doi.org/10.1016/j.ecresq.2018.05.007>
- Józsa, K., Barrett, K. C., Amukune, S., Calchei, M., Masoud, G., Hashmi, S. I., Podráczy, J., Nyitrai, Á., & Wang, J. (2020). Implications of the DMQ for education and human development: Culture, age and school performance. In G. A. Morgan, H.-F. Liao, & K. Józsa (Eds.), *Assessing mastery motivation in children using the Dimensions of Mastery Questionnaire (DMQ)* (pp. 132–157). Szent István University.
- Józsa, K., Kis, N., & Huang, S. (2017). Mastery motivation in school subjects in Hungary and Taiwan. *Hungarian Educational Research Journal*, 7(2), 158–177. <https://doi.org/10.14413/HERJ/7/2/10>
- Józsa, K., & Molnár, É. (2013). The relationship between mastery motivation, self-regulated learning, and school success: A Hungarian and wider European perspective. In K. C. Barrett, N. Fox, G. A. Morgan, D. J. Fidler, & L. A. Daunhauer (Eds.), *Handbook of self-regulatory processes in development: New directions and international perspectives* (pp. 265–304). Psychology Press. <https://doi.org/10.4324/9780203080719.ch13>
- Józsa, K., Wang, J., Barrett, K. C., & Morgan, G. A. (2014). Age and cultural differences in self-perceptions of mastery motivation and competence in American, Chinese, and Hungarian school age children. *Child Development Research*, 2014, 1–16. <https://doi.org/10.1155/2014/803061>

- Karimova, K., & Csapó, B. (2021). Cognitive and affective components of verbal self-concepts and internal/external frame of reference within the multidimensional verbal domain. *SAGE Open*, *11*(2). <https://doi.org/10.1177/21582440211018683>
- Lazowski, R. A., & Hulleman, C. S. (2016). Motivation interventions in education: A meta-analytic review. *Review of Educational Research*, *86*(2), 602–640. <https://doi.org/10.3102/0034654315617832>
- Lee, W., Lee, M. J., & Bong, M. (2014). Testing interest and self-efficacy as predictors of academic self-regulation and achievement. *Contemporary Educational Psychology*, *39*(2), 86–99. <https://doi.org/10.1016/J.CEDPSYCH.2014.02.002>
- Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, *97*(2), 184–196. <https://doi.org/10.1037/0022-0663.97.2.184>
- Liou, P. Y., Wang, C. L., Lin, J. J. H., & Areepattamannil, S. (2021). Assessing students' motivational beliefs about learning science across grade level and gender. *Journal of Experimental Education*, *89*(4), 605–624. <https://doi.org/10.1080/00220973.2020.1721413>
- Liu, W. (2021). Does teacher immediacy affect students? A systematic review of the association between teacher verbal and non-verbal immediacy and student motivation. *Frontiers in Psychology*, *12*. <https://doi.org/10.3389/fpsyg.2021.713978>
- Mendoza, N. B., & Yan, Z. (2023). Exploring the moderating role of well-being on the adaptive link between self-assessment practices and learning achievement. *Studies in Educational Evaluation*, *77*, 101249. <https://doi.org/10.1016/J.STUEDUC.2023.101249>
- Morgan, G. A., Harmon, R. J., & Maslin-Cole, C. A. (1990). Mastery motivation: Definition and measurement. *Early Education and Development*, *9289*(1), 318–339. <https://doi.org/10.1207/s15566935eed0105>
- Morgan, G. A., Liao, H. F., & Józsa, K. (Eds.). (2020). *Assessing mastery motivation in children using the Dimensions of Mastery Questionnaire (DMQ)*. Szent István University.
- Morgan, G. A., Wang, J., Barrett, K. C., Lio, H.-F., Wang, P.-J., Huang, S.-Y., & Józsa, K. (2019). *The Revised Dimensions of Mastery Questionnaire (DMQ 18): A manual and forms for its use and scoring*. <https://sites.google.com/a/rams.colostate.edu/georgemorgan/mastery-motivation>
- Morgan, G. A., Wang, J., Liao, H.-F., & Xu, Q. (2013). Using the Dimensions of Mastery Questionnaire to assess mastery motivation of English- and Chinese- speaking children: Psychometrics and implications for self-regulation. In K. C. Barrett, N. A. Fox, D. J. Fidler, & L. A. Daunhauer (Eds.), *Handbook of self-regulatory processes in development: New directions and international perspectives* (pp. 305–335). Psychology Press.
- Peng, C. (2021). The academic motivation and engagement of students in English as a foreign language classes: Does teacher praise matter? *Frontiers in Psychology*, *12*, 778174. <https://doi.org/10.3389/FPSYG.2021.778174/BIBTEX>

- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667–686. <https://doi.org/10.1037/0022-0663.95.4.667>
- Rammstedt, B. (2018). Relationships between personality and cognitive ability: A facet-level analysis. *Journal of Intelligence*, 6(28). <https://doi.org/10.3390/jintelligence6020028>
- Rash, J. A., Thomas, J. C., Campbell, T. S., Letourneau, N., Granger, D. A., Giesbrecht, G. F., Kaplan, B. J., Field, C. J., Dewey, D., Bell, R. C., Bernier, F. P., Cantell, M., Casey, L. M., Eliasziw, M., Farmer, A., Gagnon, L., Goonewardene, L., Johnston, D. W., Kooistra, L., ... Singhal, N. (2016). Developmental origins of infant stress reactivity profiles: A multi-system approach. *Developmental Psychobiology*, 58(5), 578–599. <https://doi.org/10.1002/DEV.21403>
- Rogers, M. A., Theule, J., Ryan, B. A., Adams, G. R., & Keating, L. (2009). Parental involvement and children's school achievement. *Canadian Journal of School Psychology*, 24(1), 34–57. <https://doi.org/10.1177/0829573508328445>
- Ryan, R. M., & Deci, E. L. (2009). Promoting self-determined school engagement: Motivation, learning, and well-being. In R. Wenzel & A. Wigfield (Eds.), *Handbook of motivation at school*. (pp. 171–195). Routledge/Taylor & Francis Group.
- Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. National Academies Press.
- Steinmayr, R., Heyder, A., Naumburg, C., Michels, J., & Wirthwein, L. (2018). School-related and Individual predictors of subjective well-being and academic achievement. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2018.02631>
- Tandler, N., & Dalbert, C. (2020). Always look on the bright side of students: does valence of teacher perceptions relate to students' educational performance? *Social Psychology of Education*, 23, 1121–1147. <https://doi.org/10.1007/s11218-020-09573-z>
- Teubner-Rhodes, S. (2020). Cognitive persistence and executive function in the multilingual brain during aging. *Frontiers in Psychology*, 11, 1–18. <https://doi.org/10.3389/fpsyg.2020.568702>
- Teubner-Rhodes, S., Vaden, K. I., Dubno, J. R., & Eckert, M. A. (2017). Cognitive persistence: Development and validation of a novel measure from the Wisconsin Card Sorting Test. *Neuropsychologia*, 102, 95–108. <https://doi.org/https://doi.org/10.1016/j.neuropsychologia.2017.05.027>
- Usher, E. L., Li, C. R., Butz, A. R., & Rojas, J. P. (2019). Perseverant grit and self-efficacy: Are both essential for children's academic success? *Journal of Educational Psychology*, 111(5), 877–902. <https://doi.org/10.1037/edu0000324>
- Vansteenkiste, M., Lens, W., Elliot, A. J., Soenens, B., & Mouratidis, A. (2014). Moving the achievement goal approach one step forward: toward a systematic examination of the autonomous and controlled reasons underlying achievement goals. *Educational Psychologist*, 49(3), 153–174. <https://doi.org/10.1080/00461520.2014.928598>

- Wang, J., & Barrett, K. C. (2013). Mastery motivation and self-regulation during early childhood. In K. C. Barret, Fox N. A., G. A. Morgan, D. J. Fidler, & L. A. Daunhauer (Eds.), *Handbook of self-regulatory processes in development, new directions and international perspectives* (pp. 337–380). Routledge.
<https://doi.org/10.4324/9780203080719.ch15>
- Watt, H. M. G. (2016). Gender and motivation. In Wentzel K. R. & Miele D. B (Eds.), *Handbook of motivation at school* (2nd ed., pp. 320–339). Routledge.
<https://doi.org/10.4324/9780203879498>
- White, R. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66(5), 297–333. <https://doi.org/10.1037/h0040934>
- Wigfield, A. (1997). Reading motivation: A domain-specific approach to motivation. *Educational Psychologist*, 32(2), 59–68. <https://doi.org/10.4324/9781315046372-1>
- Wigfield, A., Tonks, S., & Eccles, J. S. (2004). Expectancy value theory in cross-cultural perspective. In *Big theories revised* (Vol. 4, pp. 165–198).
- Yarrow, L. J., Klein, R. P., Lomonaco, S., & Morgan, G. A. (1975). Cognitive and motivational development in early childhood. In Friedlander B.Z., G. M. Sterritt, & G. E. Kirk (Eds.), *Exceptional infant, assessment and intervention* (pp. 491–502). Bruner/Mazel.

List of Related Publications

Article publications

1. Calchei, M., Amukune, S., & Józsa, K. (2024). Comparing subject-specific mastery motivation in Hungary and the Republic of Moldova. *Frontiers in education*, 8. <http://doi.org/10.3389/feduc.2023.1259391>
2. Calchei, M., Oo, TZ, & Józsa, K. (2023). Subject Specific Mastery Motivation in Moldovan Middle School Students. *Behavioral Sciences: Open Access Psychology & Cognition Journal*, 13 (2). <http://doi.org/10.3390/bs13020166>
3. Calchei, M., Barrett, KC, Amukune, S., & Józsa, K. (2022). Comparative study of Russian- and Romanian-speaking students' mastery motivation in the Republic of Moldova. *Cogent Education*, 9 (1). <http://doi.org/10.1080/2331186X.2022.2143039>
4. Amukune, S., Calchei, M. & Józsa, K. (2021). Swahili version of the Dimensions of Mastery Questionnaire: Adaptation and psychometric properties. *Revista Electronica De Investigacion Educativa Y Psicopedagogica / Electronic Journal of Research in Educational Psychology*, 19(3) (55), 625-650. <http://doi.org/10.25115/ejrep.v19i55.3910>

International conferences

1. Calchei, M., & Józsa, K. (2022b). Factorial Validity and Invariance of the Subject Specific Mastery Motivation Questionnaire Among Moldovan Middle School Students. In *21st century skills, literacy, equal opportunities* (pp. 309–309).
2. Calchei, M., & Józsa, K. (2022a). A study on the correlation between the subject specific mastery motivation questionnaire and the scales of the dimensions of mastery motivation. In *XVIII. 18th Conference on Educational Assessment* (pp. 33–33).
3. Amukune, S., Calchei, M. & Józsa, K. (2021). Swahili version of the Dimensions of Mastery Questionnaire: Adaptation and psychometric properties. *Revista Electronica De Investigacion Educativa Y Psicopedagogica / Electronic Journal of Research in Educational Psychology*, 19(3) (55), 625-650. <http://doi.org/10.25115/ejrep.v19i55.3910>
4. Calchei, M. (2020). Measuring Mastery Motivation in Moldovan Context: Key Issues and Considerations. In *VI. National Conference of Young Psychological and Pedagogical Researchers (IPSZILON) - Program and summaries / VI. National Conference of Young Psychological and Pedagogical Researchers - Book of Abstracts* (pp. 31–31).
5. Calchei, M., Amukune, S., & Józsa, K. (2020). The Russian and Romanian Versions of Dimensions of Mastery Questionnaire. In *Educational science – possible answers for the challenges of the new millennium: 13th training and practice international conference on educational science* (pp. 165–165).
6. Calchei, M., & Józsa, K. (2020). Adaptation of the Subject Specific Mastery Motivation Questionnaire in the context of the Republic of Moldova. In *Neveléstudomány – Válaszlehetőségek az új évezred kihívásaira : 13. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia [Educational Science – Possible Answers for the Challenges of the New Millennium: 13th Training and Practice International Conference on Educational Science]* (pp. 113–113).
7. Amukune, S., Calchei, M. & Józsa, K. (2020). Adaptation of questionnaire and task measures into a different culture for educational assessment of 3- 8-year-old children. In *Neveléstudomány – Válaszlehetőségek az új évezred kihívásaira : 13. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia [Educational Science – Possible Answers for the Challenges of the New Millennium: 13th Training and Practice International Conference on Educational Science]* (pp. 114–114).

8. Calchei, M. (2019). Educational Challenges Triggered by the Linguistic Policy -The Case of the Republic of Moldova. In *Nemzetközi neveléstudományi irányvonalak és dimenziók határok nélkül* (pp. 148–148).

Chapters in books

1. Fajrianthi, F., Wang, J., Amukune, S., Calchei, M., & Morgan, G. A. (2020). Best Practices in Translating and Adapting DMQ 18 to Other Languages and Cultures. G. A. Morgan, H.-F. Liao, & K. Józsa (Eds.), *Assessing mastery motivation in children using the Dimensions of Mastery Questionnaire (DMQ)* (pp. 225–249).

2. Józsa, K., Barrett, K. C., Amukune, S., Calchei, M., Masoud, G., Hashmi, S. I., Podráczky, J., Nyitrai, Á., & Wang, J. (2020). Implications of the DMQ for education and human development: culture, age and school performance. G. A. Morgan, H.-F. Liao, & K. Józsa (Eds.), *Assessing mastery motivation in children using the Dimensions of Mastery Questionnaire (DMQ)* (pp. 133–158).

3. Huang, S.-Y., Liao, H.-F., Józsa, K., Calchei, M., Özbey, S., & Morgan, G. A. (2020). Overview of DMQ 18, current research, and preliminary norms. In G. A. Morgan, H.-F. Liao, & K. Józsa (Eds.), *Assessing mastery motivation in children using the Dimensions of Mastery Questionnaire (DMQ)* (pp. 65–86). Szent István University. (2020).