

ACADEMIC SELF-CONCEPT AND MASTERY MOTIVATION IN STUDENTS WITH LEARNING DISABILITIES

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Abstract

The purpose of this study was to examine self-concept (SC) and mastery motivation (MM) of students with learning disabilities (LD) and to explore their relationship. The cross-sectional study involved 103 children with LD from grades 6, 8, and 10. Participants were administered the Self-Description Questionnaire (SDQ) and the Dimensions of Mastery Questionnaire (DMQ). The approach we used focused on intragroup differences within the LD population. Significant individual differences were found within the LD population, with type of diagnosis (single LD, multiple LD) and parental background playing important roles in self-perceived abilities and motivation of children and youth with LD. The different facets of the self-concept are related to mastery motivation in the different domains, indicating that lower self-perceived academic abilities may contribute to lower motivation in the given domains.

Keywords: self-concept; mastery motivation; learning disability

Introduction

Learning disabilities (LD) are defined as neurodevelopmental disorders that impede the development and use of specific academic skills such as reading,

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writing or arithmetic. Symptoms may include slow, inaccurate and effortful reading, writing, arithmetic or mathematical reasoning (American Psychiatric Association, 2013). In some cases, problems occur in one domain of academic learning, but often more than one academic domains are impaired.

Individuals with LD frequently experience difficulties at school. Although, early signs of LD may appear in the preschool years, many students with LD are exposed to an extensive amount of failure before being diagnosed. Once the diagnosis is given, these students are often accommodated in a way that sets them apart from their peers, making them more aware of their differences. For these reasons, children with LD are more vulnerable to develop negative self-concepts and self-perceptions of ability (Chapman, 1988; Zeleke, 2004). Having low perceived abilities and thus low expectations in an academic domain may hinder individuals with LD from choosing or putting effort into certain tasks or learning activities (Covington, 1992). Thus, low self-perceived abilities may go hand in hand with lower motivation in most students with LD.

Our study aims at the investigation of the self-concept (SC) and the mastery motivation (MM) of students with LD and the exploration if the two constructs are related in children with LD. We focused on intragroup differences within the LD population rather than comparing the LD and non- LD children. We hypothesize significant individual differences exist within the LD population, and that type of diagnosis, age, gender or family background may play an important role in self-perceived abilities and motivation of children with LD. Based on previous research on the relationship between self-concept and motivational constructs (e.g., Guay, Ratelle, Roy, & Litalien, 2010; Weidinger, Spinath, & Steinmayr, 2016) in typically developing individuals, we also expect self-perceived abilities to be positively associated with mastery motivation in students with LD.

Self-concept and learning disabilities

Self-concept is a multifaceted, hierarchical construct that involves self-perceptions in academic and non-academic domains (Marsh, 2014). Several studies compared SC of students with and without LD (*for reviews see* Chapman, 1988; Zeleke, 2004). Most of these focused on the academic self-concept (e.g., Akande, 1997; Stanovich, Jordan, & Perot, 1998), but some also investigated social or general aspects of the self (e.g., Cooley & Ayres, 1988; Gans, Kenny, & Ghany, 2003; Sabornie, 1994). In line with the dominant theoretical models,

research on self-concept in LD mainly targeted the multidimensional self-concept but referred to perceived competences in different domains as one general academic self-concept (Zelege, 2004). Results were first summarized by Chapman (1988) who conducted a meta-analysis of studies published between 1974 and 1986. His findings showed that students with LD had lower self-concepts than students without LD, the differences being the most prominent in academic self-concept. Zelege (2004) reviewed more recent studies with the aim of updating Chapman's review and analysing differences between the academic and the social domains of self-concept as well as general self. Results supported the lower academic self-concept of students with LD as compared to typically developing peers, however, findings were less consistent regarding the general self-concept. Although some studies reported on the lower general self-worth of children with LD, the majority of studies conducted to compare the general self-concept of students with and without LD found no significant differences between the groups. The same held true for the social self-concept: contradictory results were reported on the differences between LD and non-LD, as well as LD and low-ability groups. Although, no straightforward conclusion could be drawn from this, Zelege (2004) emphasized that nearly three-fourths of the reviewed studies have evidenced no differences between the groups. Thus, it can be concluded that LD affects academic self-concept, but seems to be less influential to non-academic components of self-perceptions.

More recently, research has been conducted to define those factors that contribute to social-emotional resilience in individuals with LD (e.g., Haft, Myers, & Hoeft, 2016; Shany, Wiener, & Assido, 2012). Some of these studies also sought to identify factors that contribute to better self-evaluations and self-esteem in these students. Results suggested that having multiple disabilities as opposed to a single disability, gender (Martínez & Semlud-Clikeman, 2004) and family factors (Tzuriel & Shomron, 2018) typically exacerbate negative outcomes. However, most of these studies explored unidimensional self-evaluations. For this reason, more research is needed to investigate differences in the multidimensional, hierarchical self-concept within the LD group, to see what individual, school- or home-related factors influence self-perceptions of students with LD.

Mastery motivation and learning disabilities

Mastery motivation is defined as a psychological force that urges an individual to attempt independently in a focused and persistent manner to solve a problem or master a skill or task (Barrett & Morgan, 2018; Busch-Rossnagel & Morgan, 2013). Previous research has established that mastery motivation predicts later cognitive ability better than early mental developmental scores, and mastery motivation is a predictor of academic achievement in children with typical development (Józsa & Barrett, 2018; Józsa & Morgan, 2014; Mokrova, O'Brien, Calkins, Leerkes, & Marcovitch, 2013). It has also been linked to self-regulatory processes (Józsa & Molnár, 2013; Wang & Barrett, 2013). Mastery motivation has also been found to predict academic performance for children with developmental disabilities (Gilmore & Cuskelly, 2009), and has been identified as a fundamental developmental construct that should be used as a key component of a comprehensive evaluation of children's functioning (Shonkoff & Phillips, 2000).

Mastery motivation is also an important aspect in the skill development of individuals with LD (Dowds & Phelan, 2006). Still, to our knowledge, no studies have investigated mastery motivation as a motivational construct in individuals with LD. Using a slightly different approach to motivation, evidence has been presented that children with LD are less persistent on academic tasks than typically developing children (Ayres, Cooley, & Dunn, 1990) and show a different motivational profile from students without LD (Sideridis, 2005).

More recently, when investigating motivational constructs of children and youth with LD, besides comparisons with typically developing peers, researchers have turned their attention to comparisons within diverse ability-level groups, such as low-achieving, non-LD peers. Although, results are somewhat ambiguous, most indicate that there is no motivational deficit in students with LD as compared to similarly achieving students (O'Shea et al., 2016). A further question to be answered is what differences exist in terms of motivation within the LD group and what factors contribute to adaptive motivational orientations in children with LD. Answering these questions would be of crucial importance for the education and individual development of these students. Also, knowing that learning disability refers to a heterogeneous group of students, it would be important to investigate motivation in the different domains of learning as a function of LD subgroup belonging (mathematics LD, reading LD, etc.).

Self-concept and motivation

High ability self-concepts are desirable educational outcomes as they are important precursors of other psychological variables regulating learning behavior (Schütte, Zimmerman, & Köller, 2017). Domain specific academic self-concepts have been associated with effort (Skaalvik & Rankin, 1995), interest in a school subject (Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005), attributions of success and failure (Marsh, 1990), valuing of school (Schütte, Zimmerman, & Köller, 2017) and engagement (Guo et al., 2016).

In the Reciprocal Effects Model (Marsh, Byrne, & Yeung, 1999; Marsh & Martin, 2011) self-concept is supposed to have a direct effect on academic achievement. Guay et al. (2010) proposed that it is autonomous academic motivation that mediates the contribution of academic self-concept to academic achievement. When investigating the mediating role of academic motivation in the relation between academic self-concept and achievement, they found sound evidence for the assumption that students whose self-perceived competences are higher achieve higher as their belief in their own skills lead them to be more motivated at school. Weidinger et al. (2016) identified influencing factors that render students vulnerable to low intrinsic motivation. In their experimental studies, task feedback affected intrinsic motivation, but the effect was fully mediated by ability self-concept. This result confirms previous theories and studies suggesting that competence beliefs mediate the effects of external events on intrinsically motivated behaviour, and domain-specific self-concepts are important determinants of motivation (Khalaila, 2015; Wigfield & Eccles, 2000). A recent study with typically developing students concluded that students' mastery motivation in different academic domains are also dependent on their competence beliefs (Szenczi, Józsa, & Kis, 2018). Knowing that LD students' academic self-concepts are usually low, the question emerges if motivation is also affected by LD status and if low perceived abilities entail low motivation in the case of students with specific learning disabilities.

Purpose of this investigation

The purpose of this investigation is to examine the domain-specific self-concept and mastery motivation of students with LD. We hypothesize significant individual differences exist within the LD population, and that type of diagnosis, age, gender or parental background may play an important role in self-perceived abilities and motivation of children with LD (Martínez & Semrud-Clikeman,

2004; Renick & Harter, 1989). Based on previous results on the relationship between self-perceptions and various motivational constructs among typically developing (e.g., Guay et al., 2010; Weidinger et al., 2016) and LD children (Zisimopoulos & Galanaki, 2009), we also expect that self-concept and mastery motivation are related in the corresponding domains of learning, i.e. self-perceptions of ability and persistence on tasks in a given academic domain are associated.

The study seeks to answer the following questions:

1. What characterizes LD students' domain-specific self-concepts and mastery motivation on the different grade levels? Are there grade level differences?
2. Are there gender differences in the self-concept and mastery motivation of students with LD?
3. Does having one or multiple academic domains impaired (math or language skills or both) affect students' self-concept and mastery motivation?
4. Are the different facets of self-concept related to mastery motivation in the different domains?
5. Do individual differences in self-concept explain differences in mastery motivation and vice versa?

Method

Participants

A total of 103 Hungarian students participated in our study from grade 6 ($n=29$; $m_{age}=13.12$), grade 8 ($n=41$, $m_{age}=14.80$) and grade 10 ($n=33$, $m_{age}=16.89$). Students were chosen randomly from the Information System of Public Education operated by the Hungarian Educational Authority and came from 42 different general education schools. All students had an LD diagnosis issued by the expert panel and attended general education classrooms. According to expert panels evidence, 50.5% of students had difficulties in mathematics (dyscalculia), 87.8% in language skills like reading (dyslexia) and writing (dysgraphia), and 47.6% in both the mathematics and the language domains. Since comorbid learning disabilities occur as frequently as isolated learning disorders (Moll, Kunze, Neuhoff, Bruder, & Schulte-Körne, 2014), the sample well represents the population. The prevalence of reading difficulties is typically higher in males than in females (Rutter, Caspi, Fergusson, Horwood, Goodman, Maughan, Moffitt, Meltzer, & Carroll, 2004) and some studies indicate that the

ratio of boys among individuals with dyscalculia is also higher. Accordingly, in our sample the ratio of boys is higher (73.5%) than that of girls. In the single LD (impaired language skills) subsample the ratio of boys is 86%, in the multiple LD subsample (impaired language and math skills) 63%. By their teachers' estimates, most students came from families of average SES (73.7%), 20.3% had below-average SES, and 6% above-average SES.

Instruments

To investigate the different dimensions of self-concept we used the Hungarian adaptation (Szenczi & Józsa, 2008) of the Self-Description Questionnaire - I (SDQ-I, Marsh, 1992). In line with the Marsh/Shavelson model of self-concept, SDQ assesses four areas of non-academic self-concept (Physical abilities, Physical appearance, Social with peers, Social with parents), three areas of academic self-concept (Verbal, Math and General School) as well as General Self. For the purposes of this study, we used the academic self-concept scales, the social and the physical abilities scales, as well as the one assessing general self. Each scale has 8 to 10 items rated from 1-5, from "not at all like me" to "exactly like me".

Mastery motivation was measured with the Hungarian version of the Dimensions of Mastery Questionnaire 17 (DMQ, Hwang et al., 2017; Józsa & Morgan, 2017; Morgan, 1997). DMQ has 45 items rated 1-5, from "not at all like me" to "exactly like me". It consists of seven scales out of which four (cognitive persistence, gross motor persistence, social persistence/mastery motivation with adults, and social persistence/mastery motivation with children) measures the instrumental aspect mastery motivation, two refers to the affective aspects (negative reactions to failure and mastery pleasure), and one is a measure of general competence. For the purposes of this study, we used the persistence scales.

Certain scales of the two instruments refer to the same or very similar domains of personality, but they measure two different constructs (self-concept and persistence) within the given domain (e.g. gross motor persistence and physical abilities self-concept). This made it possible for us to investigate associations between the two constructs within domains.

Both instruments were computerized so that they could be used with individuals with reading difficulties: the computer read items of the questionnaires to students who responded by clicking on a pictogram on a Likert

scale. Values of the five-point Likert-scale were depicted by circles of different size and of different shades of blue. When choosing value one, students clicked on the smallest, light blue circle. Higher values were represented by darker colors and larger circles, so for value 5, students clicked on the biggest, darkest circle (Figure 1). Before the data collection, participants watched a short video explaining how to fill in the questionnaires.

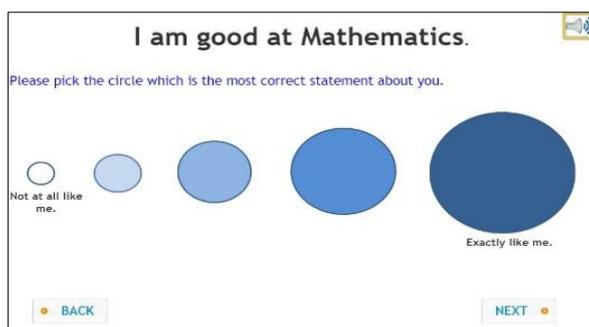


Figure 1. Example screenshot of an online Likert item

Confirmatory Factor Analyses supported the factor structure of the two questionnaires. Reliabilities of the scales of the two measures are shown in Table 1.

Scale means were calculated for each student, then linear transformations were conducted on the means, using the formula $(x-1)*25$. This way, the scale would range between 0 and 100, called a percentage points (%p) scale. Correspondences between the 1-5 values of the scale and the percentage points are as follows: 1=0%p, 2=25%p, 3=50%p, 4=75%p, and 5=100%p.

Table 1. Reliabilities of the scales of the SDQ-I and DMQ questionnaires

Scales	Dimensions	Cronbach- α	<i>N</i> of items	<i>M</i>	<i>SD</i>
SDQ	Verbal	.94	10	51	25
	Math	.94	10	43	27
	General School	.82	10	51	17
	General Self	.89	10	75	18
	Physical abilities	.80	9	63	20
	Social with peers	.89	8	65	21
	Social with parents	.78	9	77	16
DMQ	Cognitive persistence	.61	9	61	17
	Gross motor persistence	.85	8	71	21
	Social persistence - adult	.74	6	68	18
	Social persistence - child	.77	6	79	18

Teachers were administered a questionnaire in which they gave information on the parental background of each child. They were asked to indicate mothers' and fathers' highest educational levels on a six-point scale (from maximum of 8 primary grades to PhD) as well as to rate the socioeconomic status of the family on a three-point scale (1=below average, 2=average, 3=above average).

Results

Self-concept and mastery motivation on the different grade levels

First, we analyzed the academic and non-academic self-concepts of students with LD on the different grade levels. Table 2 shows the means and standard deviations of the different facets of SC on each grade level as well as results of the ANOVA. No systematic grade-level differences emerged in the self-concepts of students with LD. From among the different facets of the self only general school self-concept declines (between grade 6 and 8) and perceptions of own physical abilities (between grade 6 and 8 and grades 8 and 10). Similarly, no significant differences were found in the mastery motivation of students with LD on the different grade levels. General school self-concept is generally lower than general self-concept on each grade level (Grade 6: $t(27)=-8.45$, $p<.001$; Grade 8: $t(38)=-8.45$; $p<.001$; Grade 10: $t(30)=-7.26$; $p<.001$).

Table 2. Self-concepts and mastery motivation on the different grade levels, ANOVA

Dimensions	Grade 6	Grade 8	Grade 10	<i>F</i>	<i>p</i>
<i>Self-concept</i>					
Verbal	54 (24)	51 (24)	49 (25)	0.34	0.71
Math	49 (24)	42 (25)	39 (31)	1.16	0.32
General School	53 (17)	43 (15)	44 (17)	3.43	0.04
General Self	79 (17)	73 (16)	74 (19)	1.03	0.36
Physical abilities	70 (19)	62 (19)	56 (22)	3.35	0.04
Social with peers	71 (23)	64 (18)	62 (23)	1.61	0.20
Social with parents	81 (12)	76 (14)	75 (20)	1.23	0.30
<i>Mastery motivation</i>					
Cognitive	64 (16)	61 (13)	60 (16)	0.68	0.51
Gross motor	77 (23)	70 (22)	66 (20)	1.86	0.16
Social – peers	82 (17)	75 (17)	80 (18)	1.52	0.22
Social – adult	69 (19)	66 (17)	70 (18)	0.54	0.59

Notes: table shows means of variables, standard deviations are in parenthesis.

Self-concept and mastery motivation as a function of the impaired domains

Very few studies investigate LD students' self-concept and motivation in the various specific LD subgroups (math LD, reading LD, etc.). This is because very often LD entails having difficulties in more than one academic domains. However, bearing in mind that both self-concept and motivation are domain-specific, it is important to explore if having an LD status affect self-concept and motivation in general, or there are differences as a function of the domain impaired. Our sample made it possible for us to explore the self-concept facets and cognitive persistence of LD students with impaired and typically developing math skills (Table 3). When comparing the math self-concept of students with Math LD with those having only impaired language skills, we found significant differences. The math self-concept of students with dyscalculia is significantly lower than that of children with dyslexia or dysgraphia. General school self-concept is also affected by having a math LD. However, no significant differences were found in the persistence variables as a function of having a math LD too.

Table 3. Self-concept and mastery motivation of LD students having one or multiple LDs

Dimensions	Impaired language	Impaired language	t	df	p
	skills	and math skills			
	<i>n</i>	<i>n</i>			
	51	49			
<i>Self-concept</i>					
Verbal	53 (23)	48 (26)	1.06	94	.29
Math	54 (26)	34 (23)	4.20	97	.001
General School	55 (16)	47 (18)	2.26	96	.03
General Self	76 (19)	74 (17)	0.70	95	.49
Physical abilities	67 (19)	58 (21)	2.20	95	.03
Social with peers	66 (20)	65 (23)	0.38	98	.70
Social with parents	77 (16)	78 (16)	-0.10	98	.92
<i>Mastery motivation</i>					
Cognitive	64 (16)	59 (16)	1.42	91	.16
Gross motor	76 (21)	67 (21)	2.29	96	.02
Social – peers	79 (19)	78 (16)	0.41	96	.69
Social – adult	69 (16)	67 (20)	0.63	98	.53

Gender differences

Results from the analysis examining gender differences indicated statistically significant differences between boys' and girls' math ($t(100)=2.99$, $p<.003$) and physical abilities ($t(27)=2.20$, $p<.02$) self-concepts, in both cases the

boys' means were higher. No significant differences were found in verbal self-concept. Persistence in the different domains of learning are also similar for boys and girls.

Parental background

Parents' highest educational level shows a weak positive correlation with persistence on cognitive tasks. Mothers' educational level is associated with general perceptions of self ($r=-.21$, $p<.01$). This correlation is negative indicating that LD children of more educated parents have lower general self-concepts than those whose mothers are less educated. No other facets of the self is associated with either mothers' or fathers' highest education.

From among the persistence variables, cognitive persistence is related to both mothers' and fathers' educational levels, the correlation being weak, positive ($r=.21$, $p<.01$ and $r=.27$, $p<.01$, respectively). Persistence in the other domains are not related to parents' educational level. No significant differences were found in terms of persistence or self-concept as a function of the SES of the family, either.

The relationship between the different domains of self-concept and mastery motivation

Correlation analysis was used to measure the strength of associations among the different domains of MM and SC. Table 4 shows correlations in the total sample. As is shown, not all facets of self-concept are related to each other. Math and verbal self-concepts are uncorrelated, but both are closely associated with general school self-concept. Self-perceived verbal abilities are not related to general self-concepts, while math ability perceptions have a weak correlation with general self. General school and general self-concepts are moderately correlated. These findings support the relative independence of the self-concept facets and the domain-specificity of academic self-concept in the case of students with LD.

The correlations between the different aspects of MM are moderate in the total sample indicating that students' persistence in the different domains of learning are moderately related to each other. LD students' persistence varies as a function of the domain of learning.

Significant moderate to strong correlations were found between several dimensions of MM and SC. Persistence in cognitive tasks are strongly associated

with math and general school self-concepts, has a moderately strong relationship with perceptions of general self and physical abilities, and a weak correlation with verbal and social aspects of self-concept. General self is associated with almost all MM variables. The correlations between the MM and the SC variables are similar to those between the different domains of MM, indicating that the relation between mastery motivation in the different domains are just as close as those of motivation dimensions and self-concept facets. Associations between the corresponding facets of SC and MM are even stronger than those between the different SC facets and the different MM facets.

Table 4. Correlations between the different SC and MM variables, total sample

Dimensions	Self-concept					Mastery motivation				
	Verbal	Math	General School	General Self	Physical abilities	Social with peers	Social with parents	Cognitive	Gross motor	Social-peers
<i>Self-concept</i>										
Verbal										
Math	n.s.									
General School	.39**	.65**								
General Self	.20*	.25*	.46**							
Physical abilities	n.s.	.40**	.40**	.53**						
Social with peers	n.s.	.23*	.34**	.69**	.58**					
Social with parents	n.s.	.20*	.22*	.29**	.23*	.42**				
<i>Mastery motivation</i>										
Cognitive	.21*	.49**	.62**	.41**	.38**	.37**	.34**			
Gross motor	n.s.	.34**	.42**	.49**	.77**	.52**	.36**	.55**		
Social - peers	n.s.	n.s.	n.s.	n.s.	.42**	.57**	.25*	.27**	.51**	
Social - adult	.23*	.25*	.27**	.27**	.26**	.43**	.30**	.35**	.38**	.37**

Note: n.s. = not significant, $p > 0.05$; * $p < 0.05$; ** $p < 0.01$

Associations between the different facets of SC and MM were investigated separately for the subsample of LD with impaired language skills (single LD subsample) versus with impaired language and math skills (multiple LD subsample). The pattern of associations in the single LD subsample is rather similar to that of the total sample (Table 5). However, in this group of LD students verbal self-concept is not related to general self, and has no link with cognitive persistence either. In the subsample, where students face difficulties both in language arts and mathematics, we found fewer significant correlations between math SC and other facets of the self. Math SC also shows only a weak correlation with cognitive persistence. In this subsample, none of the academic components of SC is related to general SC, neither is cognitive persistence. General self is rather closely associated with non-academic components of SC and MM, like peer relations SC and the social domains of MM.

Table 5. Correlations between the different SC and MM variables, single and multiple LD samples

Dimensions	Self-concept							Mastery motivation			
	Verbal	Math	General School	General Self	Physical abilities	Social with peers	Social with parents	Cognitive	Gross motor	Social -peers	Social -adult
<i>Self-concept</i>											
Verbal		n.s.	.37**	.40**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	.37**
Math	n.s.		.62**	.42**	.47**	.29*	n.s.	.63**	.40**	n.s.	.40**
General School	.39**	.63**		.67**	.54**	.48**	n.s.	.62**	.41**	n.s.	.33*
General Self	n.s.	n.s.	n.s.		.57**	.65**	.35*	.58**	.53**	.46**	.65**
Physical abilities	n.s.	n.s.	n.s.	.47**		.53**	n.s.	.45**	.81**	.60**	.32*
Social with peers	n.s.	n.s.	n.s.	.73**	.62**		.50**	.60**	.58**	.60**	.41**
Social with parents	n.s.	.35*	n.s.	n.s.	n.s.	.35*		.43**	ns.	n.s.	n.s.
<i>Mastery motivation</i>											
Cognitive	n.s.	.30*	.59**	n.s.	n.s.	n.s.	n.s.		.51**	.51**	.47**
Gross motor	n.s.	n.s.	.34**	.43**	.70**	.47**	.45**	.55**		.72**	.39**
Social - peers	n.s.	n.s.	n.s.	.54**	n.s.	.56**	.29**	n.s.	.30*		n.s.
Social - adult	n.s.	n.s.	n.s.	.53**	n.s.	.45**	.40**	n.s.	.36**	.49**	

Note: n.s. = not significant, $p > 0.05$; * $p < 0.05$; ** $p < 0.01$; lower triangle shows correlations in the math and language skills LD sample, upper triangle shows correlations in the only language skills LD sample

Regression analyses were carried out to test if variance of self-concept facets explain the individual differences in mastery motivation. Persistence in the four domains were regarded as dependent variables. Models included general school and general self-concepts as independent variables along with the corresponding self-concept facets (Table 6).

Table 6. Regression analyses with MM variables as dependent variables, $r^2\%$

Independent variables:	Dependent variables: Mastery motivation domains			
Self-concept facets	Cognitive	Gross motor	Social - peer	Social - adult
Verbal	n.s.	-	-	-
Math	n.s.	-	-	-
General School	33	n.s.	n.s.	n.s.
General Self	8	n.s.	n.s.	29
Physical abilities	-	55	-	-
Social with peers	-	-	28	-
Social with parents	-	-	-	n.s.
Total variance explained	46	62	34	29

Note: n.s.= not significant, - = not included in the model

Results suggest that mastery motives are explained by the self-concept facets. Persistence in cognitive tasks is influenced by self-concept of academic abilities. General school self-concept, i.e. how children see their own school-related abilities, explain more than 33% of individual differences in cognitive persistence. Physical abilities self-concept explains more than half of the variance of persistence in gross motor tasks, and peer relation self-concept explain around one third of the individual differences in social with peers mastery

motivation. Social with adults mastery motivation is influenced by general self-concept.

We also tested if self-concept is explained by mastery motivation variables. In the following regression models, we involved the different facets of SC as dependent variables and persistence in the different domains as independent variables (Table 7). All self-concept facets are explained by at least one mastery motive. Cognitive persistence explains individual differences in verbal, math and general school self-concepts. The contribution of gross motor persistence to physical abilities self-concept is even higher than that of physical abilities self-concept to gross motor persistence. Peer relations persistence contributes to general and peer relation self-concepts just like social with adults mastery motivation. General self is only explained by social persistence, neither cognitive nor gross motor persistence explain individual variances in general self-perceptions. General school, on the other hand, is only explained by cognitive persistence. Total explained variances range between 11–61% indicating a close connection between the different aspects of the two measured constructs.

Table 7. Regression analyses with SC variables as dependent variables, $r^2\beta\%$

Independent variables: MM dimensions	Dependent variables: Self-concept facets						
	Verbal	Math	General school	General self	Physical abilities	Social with peers	Social with parents
Cognitive	6	20	35	n.s.	n.s.	n.s.	n.s.
Gross motor	n.s.	n.s.	n.s.	n.s.	61	n.s.	n.s.
Social – peer	n.s.	n.s.	n.s.	11	n.s.	20	n.s.
Social - adult	5	n.s.	n.s.	21	n.s.	8	n.s.
Total variance expl.	11	24	39	42	61	41	18

Discussion

The purpose of our study was to examine the self-concept and mastery motivation of students with learning disabilities and to analyze their relationship. Although some studies compared the self-perception and motivation of LD students with typically developing populations (Zisimopoulos & Galanaki, 2009), research is rarely carried out to identify those factors that contribute to higher self-concept and motivation in individuals with LD. For this reason, the

approach we used focused on intragroup differences within the LD population rather than on the intergroup differences between students with and without LD.

Self-concept is a multifaceted hierarchical construct that involves self-perceptions in academic and non-academic domains (Marsh, 2014). In line with this definition, we did not consider self-concept a unidimensional construct, but explored the different facets separately. This approach allowed us to address the different academic (verbal, math) domains separately and analyze relations with corresponding domains of learning in terms of impairments and/or motivation.

Motivation research operationalizes learning motivation according to various theories. The motivational construct we explored was mastery motivation, the psychological force to persist in the face of challenge, which is an important aspect in the development of students with learning problems (Morgan, Józsa, & Liao, 2017).

We assumed significant individual differences within the LD population in terms of self-concept and mastery motivation, and that type of diagnosis, grade level, gender and parental background may play an important role in self-perceived abilities and motivation of children with LD. We also expected self-perceived abilities to be positively associated with mastery motivation.

Our cross-sectional data indicated that the developmental trajectories of self-concept and mastery motivation are different from those usually measured in typically developing samples. Academic self-concept (e.g. Chang, McBride-Chang, Stewart, & Au, 2003; Watkins & Dong, 1997) and persistence in the different domains of learning usually decline with age (e.g., Józsa, Kis, & Huang, 2017; Józsa, Wang, Barrett, & Morgan, 2014). In our LD sample, however, very few grade level differences emerged in the different facets of self-concept (only in General School and Physical abilities SC), and none in the different domains of mastery motivation. Academic components of the self are rather stable and lower than the General Self on each grade level, implying that students with LD are maybe aware of their difficulties throughout early and late adolescence, but can keep up a relatively good general self-concept of themselves. Regarding the non-significant grade-level differences in motivation, it can be assumed that either by grade 6 students with LD have a well-established motivational system, or that having an LD diagnosis affects mastery motivation to a greater extent than age or grade-level. This latter idea is also supported by previous findings with other disability groups (e.g., Józsa & Molnár, 2013).

Gender and parental background also play minor roles in the self-concept and mastery motivation of students with LD. This is also in line with previous research results showing that sociodemographic factors do not play an important role in the mastery motivation of adolescents with a disability (Majnemer et al., 2013). However, a significant finding that calls for further attention is that mothers' level of education negatively correlates with students' general SC, that is, the higher educated the mothers, the less valuable their children with LD consider themselves. On the other hand, parents' educational level is positively linked with cognitive persistence, indicating that children with LD of more educated parents also put more effort into cognitively demanding tasks. This pattern might be explained by the different educational styles or expectations of parents shown to be influential on the mastery motivation of typically (Moorman, & Pomerantz, 2008) and atypically developing children (e.g., Hauser-Cram, 1996; Wang, Morgan, Hwang, Chen, & Liao, 2014). Further research is necessary to clarify the role of parents in the development of self-concept and mastery motivation of children with LD.

Bearing in mind that both self-concept and motivation are domain-specific, we explored if having an LD status affects self-concept and motivation in general, or there are differences as a function of the domain impaired. Our sample made it possible for us to compare the self-concept facets and cognitive persistence of students with impaired verbal skills (single LD in this study) to those with impaired verbal and math skills (multiple LD in this study). Not surprisingly, having impaired math skills besides experiencing difficulties in subjects requiring the use of verbal skills affects math SC. More importantly, though, having multiple LD not only affects the corresponding SC components, but leads to lower general school self-concept. This result implies that having multiple LD is a risk factor: those whose difficulties tap more than one domains of learning are more vulnerable to developing negative beliefs about their learning skills than those who have single LD. Having multiple LD has been identified as a risk factor for socioemotional adjustment and well-being for students with LD by previous work (Martínez & Semrud-Clikeman, 2004). However, it is not clear if experiencing difficulties in two domains of learning compared to one has the same effect on general self-concept. Our sample made it possible for us to compare students with verbal LD to those with verbal and math LD. Therefore, it is also possible that experiencing difficulties in math itself is more harmful for general self-concept than verbal difficulties. Yet, our results

clearly draw attention to the differences between the different LD groups, and more research in this area might further clarify the matter of self-concept of students with different LD diagnoses (single and multiple, verbal and math).

The hierarchical nature of SC implies that at the apex of the hierarchy there is a general self, and that higher order components are affected by self-perceptions on the lower levels (Marsh, 1990; 2014). Analyzing the relationships between the different facets of the self, thus, tells us about the structure of the construct. Generally, for students with a single LD, academic components are related to general self, meaning that even for students who struggle at school because of an impairment in a domain of learning, self-evaluations of academic abilities are important contributors to how they perceive themselves in general. However, when having multiple LD, none of the academic components of SC are significantly related to general SC. General self is rather defined by the non-academic components like peer relations and physical abilities. As people are motivated to maintain a positive self-concept, they use a set of strategies for self-enhancement and self-protection. One form of this is self-affirmation. After a threat in one domain, people may focus on their strengths in other domains (Sherman & Cohen, 2006). For students with multiple LD, school learning may involve a threat to their positive general self-concept, and thus, they may devalue the importance of academic components of the self to protect a positive self-concept. This, one hand, is a positive tendency, as students with more severe learning problems can uphold a positive concept of themselves. On the other hand, devaluating academic facets of the self, may contribute to attributing less importance and value for school-based learning, which, in turn, might lead to motivational problems (Wigfield & Eccles, 2000).

Our study also aimed at the exploration of the relationship between the self-concept and mastery motivation of students with LD. Several previous studies supported that learning-related components of self-concept are generally lower for students with LD (Chapman, 1988; Zeleke, 2004). As academic self-concept is often associated with motivation, we investigated whether lower perceived abilities may contribute to motivational problems in case of students with LD. Although, correlational data do not allow for the drawing of conclusions about causal relationships, the result that the different facets of the self-concept are related to mastery motivation in the different domains can be interpreted as having lower perceived abilities going hand in hand with being less persistent. Students who perceive their own skills and achievement lower and

has lower general self-concept, will not keep on trying when faced with a challenging task and will give up more easily.

Limitations and directions for future research

Implications of our study extend to Hungarian children with LD. Our results are based on the analysis of data collected by self-report questionnaires. Limitations of questionnaire studies are well-known. We must consider the possibility that students' answers do not or just partly reflect self-concept and motivation in reality. For the evaluation of motivational variables, it is important to use parent and teacher questionnaires too. Observational studies based on student behaviour would also provide important information in terms of motivation. Using more tools simultaneously (such as questionnaires and observations) would enhance the reliability of the study.

The analysis supported the relationship between the self-concept facets and dimensions of mastery motivation. The research design we used, however, did not allow for the examination of the causal relationship between the two constructs, yet it would yield important implications. It is, therefore, important to carry out longitudinal studies among children with LD. It would also be useful to involve school achievement variables (grades, standardized test results) into the investigations.

Our sample comprised of students with impaired language or impaired language and math skills. We compared their self-concepts and motivation. In many cases significant differences emerged in the two subsamples. However, it is not evident what causes this difference. It is possible that differences can be attributed to impaired versus unimpaired math skills, or single versus multiple LD. We must also consider the possibility that both factors play an important role, that is, having problems in math play a more important role in the development of self-concept and motivation than impaired language skills and experiencing difficulties in more than one domains of learning also affect self-concept and motivation. This question also requires further investigations.

Conclusion

Our results have both theoretical and practical implications. Theoretically, it contributed to growing knowledge on what influences self-concepts and mastery motivation of students with LD, and how self-perceptions

and motivation are related to each other in case of students experiencing difficulties at school. It also highlighted some questions that need further investigation. Practically, it drew attention to some risk factors and developmental patterns that have to be taken into consideration when planning and implementing the special educational support of these students. For instance, it would be of great educational concern to foster the development of positive self-perceptions of students with learning problems, and to develop techniques and methodologies that support the autonomous, persistent mastery attempts of children struggling at school.

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References

- Akande, A. (1997). The perception of ability scale for students (PASS) in Africa and New Zealand. *School Psychology International*, 18(2), 179-189.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Ayres, R., Cooley, E., & Dunn, C. (1990). Self-concept, attribution, and persistence in learning-disabled students. *Journal of School Psychology*, 28(2), 153-163.
- Barrett, K. C., & Morgan, G. A. (2018). Mastery motivation: Retrospect, present, and future directions. In A. Elliot, (Ed.), *Advances in Motivation Science*. Vol. 5 (pp. 2-39). Amsterdam: Elsevier.
- Busch-Rossnagel, N. A., & Morgan, G. A. (2013). Introduction to the mastery motivation and self-regulation section. 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). New York, NY: Psychology Press.
- Chang, L., McBride-Chang, C., Stewart, S., & Au, E. (2003). Life satisfaction, self-concept, and family relations in Chinese adolescents and children. *International Journal of Behavioral Development, 27*(2), 182-189.
- Chapman, J. W. (1988). Learning disabled children's self-concepts. *Review of Educational Research, 58*, 347-371.
- Cooley, E. J., & Ayres, R. R. (1988). Self-concept and success-failure attributions of nonhandicapped students and students with learning disabilities. *Journal of Learning Disabilities, 21*(3), 174-178.
- Covington, M. V. (1992). *Making the Grade: A Self-Worth Perspective on Motivation and School Reform*. New York: Cambridge Univ. Press.
- Dowds, B., & Phelan, C. (2006). Perceptions of success: Individuals with learning disabilities identify factors that contributed to their academic accomplishments. Proceedings of the 14th World Congress on Learning Disabilities. *A Multidisciplinary Approach to Learning Disabilities, 149-157*.
- Gans, A. M., Kenny, M. C., & Ghany, D. L. (2003). Comparing the self-concept of students with and without learning disabilities. *Journal of Learning Disabilities, 36*, 287-295.
- Gilmore, L., & Cuskelly, M. (2009). A longitudinal study of motivation and competence in children with Down syndrome: Early childhood to early adolescence. *Journal of Intellectual Disability Research, 53*(5), 484-492.
- Guay, F., Ratelle, C. F., Roy, A., & Litalien, D. (2010). Academic self-concept, autonomous academic motivation, and academic achievement: Mediating and additive effects. *Learning and Individual Differences, 20*(6), 644-653.
- Guo, J., Nagengast, B., Marsh, H. W., Kelava, A., Gaspard, H., Brandt, H., ... & Brisson, B. (2016). Probing the unique contributions of self-concept, task values, and their interactions using multiple value facets and multiple academic outcomes. *AERA Open, 2*(1), 1-20.
- Haft, S. L., Myers, C. A., & Hoeft, F. (2016). Socio-emotional and cognitive resilience in children with reading disabilities. *Current Opinion in Behavioral Sciences, 10*, 133-141.
- Hauser-Cram, P. (1996). Mastery motivation in 3-year old children with Down syndrome. In D. J. Messer (Eds.), *Mastery motivation in early childhood:*

- Development, measurement and social processes* (pp. 231-250.) London and New York: Routledge.
- Hwang, A.-W., Wang, J., Józsa, K., Wang, P.-J., Liao, 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.
- 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(4), 81-92.
- Józsa, K., Kis, N., & Huang, S.-Y. (2017). Mastery motivation in school subjects in Hungary and Taiwan. *Hungarian Educational Research Journal*, 7(2), 158-177.
- 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. 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. 265-304.) New York, NY: Psychology Press.
- Józsa, K., & Morgan, G. A. (2014). Developmental changes in cognitive persistence and academic achievement between grade 4 and grade 8. *European Journal of Psychology of Education*, 29(3), 521-535.
- Józsa, K., & Morgan, G. A. (2017). Reversed items in Likert scales: Filtering out invalid responders. *Journal of Psychological and Educational Research*, 25(1), 7-25.
- 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, Article ID 803061, 1-16.
- Khalaila, R. (2015). The relationship between academic self-concept, intrinsic motivation, test anxiety, and academic achievement among nursing students: mediating and moderating effects. *Nurse Education Today*, 35(3), 432-438.
- Majnemer, A., Shikako-Thomas, K., Lach, L., Shevell, M., Law, M., Schmitz, N., & The UALA group. (2013). Mastery motivation in adolescents with cerebral palsy. *Research in Developmental Disabilities*, 34(10), 3384-3392.

- Marsh, H. W. (1990). The structure of academic self-concept: The Marsh/Shavelson model. *Journal of Educational Psychology*, 82(4), 623-636.
- Marsh, H. W. (1992). *Self Description Questionnaire I (SDQI): Manual*. New South Wales, Australia: University of Western Sydney, Faculty of Education.
- Marsh, H. W. (2014). Academic self-concept: Theory, measurement and research. In J. Suls (Ed.), *Psychological perspectives on the self. Volume 4: The self in social perspective* (pp. 59-98). Hillsdale, NJ, US: Lawrence Erlbaum.
- Marsh, H. W., Byrne, B. M., & Yeung, S. Y. (1999). Causal ordering of academic self-concept and achievement: Reanalysis of a pioneering study and revised recommendations. *Educational Psychologist*, 34(3), 155-167.
- Marsh, H. W., & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *British Journal of Educational Psychology*, 81, 59-77.
- Marsh, H. W., Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2005). Academic self-concept, interest, grades, and standardized test scores: Reciprocal effects models of causal ordering. *Child Development*, 76, 397-416.
- Martínez, R., & Semrud-Clikeman, M. (2004). Emotional adjustment of young adolescents with different learning disability subtypes. *Journal of Learning Disabilities*, 37, 411-420.
- Mokrova, I., O'Brien, M., Calkins, S. D., Leerkes, E. M., & Marcovitch, S. (2013). The role of persistence at preschool age in academic skills at kindergarten. *European Journal of Psychology of Education*, 28(4), 1495-1503.
- Moll, K., Kunze, S., Neuhoff, N., Bruder, J., & Schulte-Körne, G. (2014). Specific learning disorder: Prevalence and gender differences. *PLoS ONE*, 9(7), e103537.
- Morgan, G. A. (1997). Dimensions of Mastery Questionnaire (Database Record). Retrieved from PsycTESTS.
- Morgan, G. A., Józsa, K., & Liao, H.-F. (2017). Introduction to the HERJ special issue on mastery motivation: Measures and results across cultures and ages. *Hungarian Educational Research Journal*, 7(2), 5-14.

- Moorman, E. A., & Pomerantz, E. M. (2008). The role of mothers' control in children's masteryorientation: A time frame analysis. *Journal of Family Psychology, 22*(5), 734-741.
- O'Shea, A. M., Booth, J. L., Barbieri, C., McGinn, K. M., Young, L. K., & Oyer, M. H. (2016). Algebra performance and motivation differences for students with learning disabilities and varying achievement levels. *Contemporary Educational Psychology, 50*, 80-96.
- Renick, M. J., & Harter, S. (1989). Impact of social comparisons on the developing self-perceptions of learning disabled students. *Journal of Educational Psychology, 81*(4), 631-638.
- Rutter, M., Caspi, A., Fergusson, D., Horwood, L. J., Goodman, R., Maughan, B., Moffitt, T. E., Meltzer, H., & Carroll, J. (2004). Sex differences in developmental reading disability: New findings from 4 epidemiological studies. *Journal of the American Medical Association, 291*(16), 2007-12.
- Sabornie, E. J. (1994). Social-affective characteristics in early adolescents identified as learning disabled and nondisabled. *Learning Disability Quarterly, 17*, 268-279.
- Schütte, K., Zimmerman, F., & Köller, O. (2017). The role of domain-specific academic self-concepts in the value students attach to school. *Learning and Individual Differences, 56*, 136-142.
- Shany, M., Wiener, J., & Assido, M. (2012). Friendship predictors of global self-worth and domain-specific self-concepts in university students with and without learning disability. *Journal of Learning Disability, 46*(5), 444-452.
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defence: Self-affirmation theory. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology*, Vol. 38 (pp. 183-242). San Diego, CA: Academic Press.
- Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington DC: National Academy Press.
- Sideridis, D. G. (2005). Social, motivational and emotional aspects of learning disabilities. *International Journal of Educational Research, 43*, 209-214.
- Skaalvik, E. M., & Rankin, R. J. (1995). A test of the internal/external frame of reference model at different levels of math and verbal self-perception. *American Educational Research Journal, 32*(1), 161-184.

- Stanovich, P. J., Jordan, A., & Perot, J. (1998). Relative differences in academic self-concept and peer acceptance among students in inclusive classrooms. *Remedial and Special Education, 19*, 120-125.
- Szenczi, B., & Józsa, K. (2008, Nov.). Az énképet vizsgáló SDQI kérdőív hazai adaptációja. [The Hungarian adaptation of the SDQ-I questionnaire]. Paper presented at VIII. Országos Neveléstudományi Konferencia: Hatékony tudomány, pedagógiai kultúra, sikeres iskola, Budapest. Tartalmi Összefoglalók. 328. [in Hungarian]
- Szenczi, B., Józsa, K., & Kis, N. (2018). Self-concept, mastery motivation and school achievement in school aged children (under review).
- Tzuriel, D., & Shomron, V. (2018). The effects of mother-child mediated learning strategies on psychological resilience and cognitive modifiability of boys with learning disability. *British Journal of Educational Psychology, 88*(2), 236-260.
- Wang, J., & Barrett, K. C. (2013). Mastery motivation and self-regulation during early childhood. In K. C. Barrett, N. A. Fox, G. A. Morgan, D. J. Fidler, & L. A. Daunhauer (Eds.), *Handbook on self-regulatory processes in development: New directions and international perspectives* (pp. 337-380). New York, NY: Psychology Press.
- Wang, P-J., Morgan, G. A., Hwang, A-W., Chen, L-C., & Liao, H-F. (2014). Do maternal interactive behaviors correlate with developmental outcomes and mastery motivation in toddlers with and without motor delay? *Physical Therapy, 94*, 1744-1754.
- Watkins, D., & Dong, Q. (1997). Age and gender differences in the self-esteem of Chinese children. *Journal of Social Psychology, 137*, 374-380.
- Weidinger, A. F., Spinath, B., & Steinmayr, R. (2016). Why does intrinsic motivation decline following negative feedback? The mediating role of ability self-concept and its moderation by goal orientations. *Learning and Individual Differences, 47*, 117-128.
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of motivation. *Contemporary Educational Psychology, 25*, 68-81.
- Zelege, S. (2004). Self-concepts of students with learning disabilities and their normally achieving peers: A review. *European Journal of Special Needs Education, 19*(2), 145-170.
- Zisimopoulos, D. A., & Galanaki, E. P. (2009). Academic Intrinsic Motivation and Perceived Academic Competence in Greek Elementary Students with

and without Learning Disabilities. *Learning Disabilities Research & Practice*, 24(1), 33-43.

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