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Affective and Social Mastery Motivation in Preschool as Predictors of Early School Success: A Longitudinal Study

Krisztián Józsa[a,*], Karen Caplovitz Barrett[b]

[a] Institute of Education, University of Szeged, 30-34, Petőfi S. Road, Szeged, 6722, Hungary
[b] Department of Human Development and Family Studies, Colorado State University, 1570 Campus Delivery, Fort Collins, CO, 80523-1570, USA

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ABSTRACT

Recent research has documented the importance of school readiness in young children. Children who start school without basic skills often continue to show lower achievement throughout schooling. Most current assessments of school readiness focus on early measures of academic skills, such as literacy and numeracy. Although these skills are useful in predicting school success, research suggests that socioemotional and motivational factors may be even more important. Moreover, although there is strong evidence supporting the importance of social and emotional *competencies*, such as emotion understanding and social skills, in school readiness, there is a dearth of research on the role of affective/expressive and social aspects of *mastery/competence motivation* in early school readiness and achievement. In the present study, we used Structural Equations Modeling to examine the role of affective aspects of mastery motivation, social mastery motivation, Socio-Economic Status (SES), and Intellectual Quotient (IQ) in preschool in longitudinally predicting math achievement, reading achievement, and social skills during grades 1 and 2 in 327 Hungarian children. Results indicated that children's negative reactions to failure/challenge predicted all of these measures of school performance, over and above the role of child IQ and SES; in addition, mastery pleasure predicted reading, and persistence in peer interaction predicted social skills in the early grades. Results contribute to the growing literature supporting the importance of motivation and of achievement-related emotions in school readiness and school success.

1. Introduction

Recent research has documented the enormous importance of school readiness for young children (Guernsey, Bornfreund, McCann, & Williams, 2014). Children who start school without basic skills such as numeracy, emerging literacy, and socioemotional competence have great difficulty catching up with peers who have higher levels of school readiness (e.g., Burchinal, Magnuson, Powell, & Hong, 2015; Snow, 2006; Tymms, Jones, Albone, & Henderson, 2009). Although in the past, school readiness has been defined primarily in terms of pre-academic skills such as emerging literacy and numeracy, there has been increased awareness of the importance of non-academic, behavioral aspects of school readiness, including socioemotional competence (e.g., Denham et al., 2012; Izard et al., 2001; Rhoades, Warren, Domitrovich, & Greenberg, 2011) and Approaches to Learning (e.g., Meng, 2015). A body of research documents that socioemotional *competence*, including emotion knowledge, social skills, and ability to appropriately regulate one's emotions, is associated not only with future social and emotional competence, but also with academic competence (e.g., Denham et al., 2012; Izard et al., 2001; Rhoades et al., 2011). However, it also has become clear that, beyond *skills*, another factor that affects school success is children's positive Approaches to Learning. "Approaches to Learning" refers to a set of interrelated behavioral propensities that facilitate children's learning, including enthusiasm for learning; focused, goal-oriented persistence; and mastery/competence motivation (e.g., Hyson, 2008; McDermott, Rikoon, Waterman, & Fantuzzo, 2012).

Positive Approaches to Learning have been found to help compensate for less-than-optimal learning environments (Meng, 2015). Although these attributes sometimes are classified as part of social emotional school readiness, they encompass *attitudes and motivation* toward learning, rather than interpersonal or emotion regulation *competencies* or *skills* (e.g., Fantuzzo, Perry, & McDermott, 2004). They are therefore quite different from the usual characteristics that are characterized as Social Emotional Learning or Socioemotional Competence, such as emotion understanding, social skills, and ability to effectively regulate emotions.

* Corresponding author.
E-mail addresses: krisztian.jozsa@colostate.edu, jozsa@sol.cc.u-szeged.hu (K. Józsa), Karen.Barrett@ColoState.EDU (K.C. Barrett).

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Disparities in all school readiness dimensions, based on early environmental differences such as those associated with low Socio-Economic Status (SES), can potentially lead to continued stratification of educational opportunity and attainment (Duncan, Magnuson, & Votruba-Drzal, 2015; Józsa, 2016). As a result, both the United States government and many U.S. states are working to require schools to assess and intervene to enhance young children's school readiness, and one of the domains of school readiness that has been targeted is Approaches to Learning. However, although there is evidence that cognitive and instrumental Approaches to Learning are important in school-related competencies and school success (e.g., Fantuzzo et al., 2004; Meng, 2015), there is a dearth of research on the role of social and emotional aspects of Approaches to Learning, and, in particular, the role of social and emotional aspects of mastery motivation, in school readiness and school success. Before discussing the present study in more detail, it is important to better define the topic on which it focuses, mastery motivation.

What is mastery motivation, and what is the role of emotion in it? Mastery motivation is a multifaceted psychological force that pushes individuals to try to master tasks or skills that are at least somewhat *challenging* (Barrett & Morgan, 1995; Morgan, Józsa, & Liao, 2017). The term, "multifaceted," highlights the many different domains of development and contexts in which mastery motivation occurs, as well as the fact that mastery motivation may differ across these contexts and domains (Barrett & Morgan, 1995; Hwang et al., 2017; Józsa, 2014; Józsa, Kis, & Huang, 2017; Wang & Barrett, 2013). Morgan, MacTurk, and Hrncir (1995) identified three main domains for mastery motivation: (1) cognitive, a child's motivation to persist at and master cognitive and school-related tasks; (2) gross motor, the motivation to master athletic skills; and (3) social, the motivation to master interpersonal relations with adults and with peers (a focus of the present study). More recently, Wang and Barrett (2013) added self-mastery as a further important domain.

Mastery motivation is not only multifaceted in terms of the domains and contexts in which it is observed and fosters development, but also the fact that it includes both expressive/affective aspects and instrumental aspects. Affective aspects include mild to moderate positive and negative emotions that promote approach and continued mastery attempts, including pleasure, interest, and enthusiasm in trying to master and/or mastering challenging tasks, as well as frustration/anger at perceived obstacles to that mastery. In addition, affective mastery motivation includes emotions that promote withdrawal and giving up, such as sadness and shame at less successful mastery (and/or anticipation of failure). Instrumental aspects include goal-directed persistence and inclination to control and/or have impact on the environment (Barrett & Morgan, 1995; Wang & Barrett, 2013).

Key features distinguishing the mastery motivation approach from other learning motivation approaches are its focus on challenging tasks and its inclusion of multiple mastery domains. Thus, although similar, mastery motivation is different from the concept of mastery *goals* in the literature on achievement goal orientations (e.g., Elliot, 2005). In this latter approach, people have a dominant approach to learning–either a *mastery* goal or a *performance* goal orientation. Those with mastery goal orientations focus on their own standards for achievement; in contrast, those with a performance goal approach seek to perform better than others. Although in both mastery motivation and achievement goal approaches, pursuit of mastery is associated with increased striving and persistence; in the achievement goal approach, one persists despite *failure*; in the mastery motivation approach, one persists despite *challenge/difficulty*.

Another related approach to motivation is Self-Determination Theory. According to Self-Determination Theory, people have three important needs – autonomy (volitional/agentic functioning), relatedness (feeling loved/valued), and competence (feeling effective). These fundamental needs form the basis for motivated behavior (Deci & Ryan, 2000). According to this approach, although autonomous striving *feels* intrinsic/self-motivated, it actually can originate in extrinsic processes such as parenting or teaching approaches (e.g., Ratelle, Guay, Larose, & Senécal, 2004). This suggests that whether the motivation truly is intrinsic or extrinsic in origin may be less important than whether it feels volitional versus controlled/anxiety-based. This is consistent with the mastery motivation approach, which focuses on persistence and emotions in different domains but does not try to determine the intrinsic or extrinsic origins of the motivation.

One of the needs specified by Self-Determination Theory, competence, has been the focus of most research on mastery motivation. Despite the true breadth of the mastery motivation conceptualization, most extant mastery motivation research has only studied instrumental mastery motivation in the cognitive domain, namely cognitive persistence. This research demonstrated that children's persistence at challenging cognitive tasks is an important predictor of school success (e.g., Gilmore, Cuskelly, & Purdie, 2003; Mercader, Presentación, Siegenthaler, Moliner, & Miranda, 2017; Mokrova, O'Brien, Calkins, Leerkes, & Marcovitch, 2013). Some studies indicated that cognitive persistence was a better predictor of cognitive development than intelligence (Józsa & Molnár, 2013; Yarrow, Klein, Lomonaco, & Morgan, 1975). A child's tendency to persist on cognitive tasks even when they become challenging would seem crucial for success in school and beyond. However, mastery motivation in other domains (such as the social domain), and affective aspects of mastery motivation may be just as important. Positive emotions and/or anger/frustration may motivate autonomous and persistent mastery attempts; whereas, negative withdrawal emotions such as shame and sadness are expected to motivate avoidance/giving up. Moreover, given evidence that socioemotional competencies are crucial aspects of school success (e.g., Denham, Bassett, Zinsser, & Wyatt, 2014), it is important to study the domains of motivational school readiness that are most relevant to socioemotional school success. The present study thus assesses the role of these less-studied aspects of mastery motivation in early school success in three domains: reading, math, and social skills. We are the first study to examine the role of mastery motivation in the peer context (social persistence) in longitudinally predicting social skills performance in the early years of school, and the first to longitudinally study the relation of affective aspects of mastery motivation to early school success in all three of these domains.

As alluded to earlier, research supports the importance of social competence in school readiness and both short-term and long-term success in school and in life (e.g., Denham et al., 2014; Jones, Greenberg, & Crowley, 2015; Schonfeld et al., 2015). However, the focus of research on social competence and school readiness has been on the importance of teaching such skills to children. Although effective interventions to teach social-emotional skills to children have been developed, children are differentially susceptible to such environmental influences on social competence (e.g., Lianos, 2015; Mortensen & Barnett, 2015). One potentially important factor in children's responses to socioemotional school readiness interventions could be their *motivation* to interact effectively with others. Yet, the role of affective and social aspects of mastery motivation in both academic and socioemotional school readiness has been under-researched.

Most research on similar types of motivation has focused on the role of being intrinsically rather than extrinsically motivated in school performance, or on whether one has mastery goals versus performance achievement goals. More recently, this latter approach has considered also whether one is motivated to *approach* performance or mastery goals versus wanting to *avoid* negative per-

formance or mastery outcomes. Although these approaches have yielded important insights, there has been relatively little attention in either of these approaches to affective aspects of motivation; moreover, study results have differed with respect to whether performance goals, especially approach performance goals, undermine or enhance achievement (Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014). It has become evident, based on the limited available research, that affective/expressive aspects of motivation may be important predictors of school performance (Berhenke, Miller, Brown, Seifer, & Dickstein, 2011; Vansteenkiste et al., 2014), and it is reasonable to expect that social mastery motivation would be associated with improved social competence.

The focus of the present investigation, mastery motivation in the face of challenge, is optimized by relatively high levels of positive emotion and relatively low levels of negative withdrawal emotions such as sadness or shame. Under such conditions, children are expected to be motivated to maintain focus on the goals they are attempting to master. Staying focused on one's goals is also characteristic of another school readiness characteristic, executive function, so it is important to distinguish mastery motivation from executive function.

Executive function involves children's self-control over their attention, thoughts, and behavior. It is usually defined as the abilities to: inhibit a well-learned but undesirable response (*inhibitory control*), hold thoughts in mind while problem-solving (*working memory*), and modify strategies to adjust to changing goals (*cognitive flexibility*). In early childhood, these three aspects of executive functions are typically difficult to separate from one another (Griffin, McCardle, & Freund, 2016). Both mastery motivation and executive functions are key, malleable school readiness characteristics manifested in goal-directed behavior; yet, they also are different in important ways. Mastery motivation involves children's *attitudes/approach* toward challenge, learning, and performance; and feelings of autonomy, desire/enthusiasm for mastery, and low negative, withdrawal emotion during mastery attempts (e.g., Barrett & Morgan, 1995; Ratelle et al., 2004). In contrast, like socioemotional competence, executive functions seem to be *skills*, which develop rapidly during early childhood.

It is readily apparent that skills can be taught, but one might imagine that motivation, as an attitude/approach rather than a skill, would be intrinsic to the person and less susceptible to external influence. It is true that motivation is not improved by the same processes one would use to teach and reinforce skills, such as practice and positive feedback about correctness of skilled performance. In fact, there is evidence that, rather than increasing motivation, tangible rewards can undermine it (e.g., Cameron & Pierce, 1994; Lepper, Greene, & Nisbett, 1973). However, research has indicated that interventions that train teachers to show children the value of trying or that train them to support students' effort (rather than performance) can increase mastery motivation (e.g., Hashmi, Seok, & Halik, 2017; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). In contrast, interventions involving repeated practice of executive functions increase executive functions (e.g., Bryck & Fisher, 2012; Diamond & Lee, 2011; Greenberg & Harris, 2012). Mastery motivation interventions, thus, typically involve affective- and autonomy-supportive teaching that focuses on the learning process rather than outcomes (e.g., Sakiz, 2017; Schiefele & Schaffner, 2015). In contrast, executive function interventions typically involve practicing the relevant skills (e.g., Bierman & Torres, 2016). Moreover, there is evidence that Approaches to Learning such as motivation and enthusiasm can mediate the role of preschool executive functions in later reading skills and socioemotional competence (Sasser, Bierman, & Heinrichs, 2015). It is therefore important to distinguish these two characteristics so that one can assess the roles of both mastery motivation and executive functions.

A report of State Early Learning Guidelines (ELGs) in February, 2016 indicated that some 48 of 50 U.S. states' ELGs included Approaches to Learning and all included social competence (National Center on Early Childhood Quality Assurance, 2016). Empirical research highlights the crucial importance of such attributes (e.g., Berhenke et al., 2011; Denham et al., 2014; Jones et al., 2015; Mokrova et al., 2013). Moreover, one recent longitudinal study using teacher reports of primarily cognitive/instrumental motivational aspects of Approaches to Learning (attentional control, persistence during learning tasks) at kindergarten found that it predicted both academic and social competence in primarily low income, minority American children at age 9 (Razza, Martin, & Brooks-Gunn, 2015).

A rapidly growing body of research thus documents the importance of socioemotional competence and of cognitive/instrumental Approaches to Learning, as predictors of academic and socioemotional school success. However, the present study focuses on a less studied school readiness domain at the nexus of these other two, namely socioemotional aspects of Approaches to Learning – affective aspects of mastery motivation and motivation to master peer relationships. We examine these important Approaches to Learning in preschool-aged children, and their longitudinal prediction of elementary school achievement and social skills.

For decades, we have known that emotions are elicited in mastery contexts (e.g., Barrett, 1998; Barrett & Morgan, 1995; Lewis, Alessandri, & Sullivan, 1992; Stipek, Recchia, & McClintic, 1992). In fact, "effectance pleasure" was a key component of White's (1959) seminal paper on effectance motivation that inspired most of the early work on mastery motivation. There is evidence that satisfaction/mastery pleasure is associated with appetitive mastery motivation (mastery approach goals) and fear of failure is associated with performance-avoidance goals (Elliot & Church, 1997; Tanaka & Yamauchi, 2001). More recently, though, research indicated that fear of failure is sometimes associated with performance-approach goals as well (Elliot & Murayama, 2008; Zusho, Pintrich, & Cortina, 2005). These findings suggest that the predominant distinctions between performance-approach, performance-avoidance, mastery-approach, and mastery-avoidance goals may not be sufficient to understand the role of mastery and performance-related emotions in school success.

More research is needed that directly assesses affective aspects of motivation, such as negative/withdrawal reactions to failure/challenge and pleasure/satisfaction, rather than considering emotions as secondary effects of type of goal or intrinsic versus extrinsic origin of motivation. In particular, the role of these affective aspects, as distinguished from the role of the general goals the child has in the achievement context, needs to be examined in connection with school readiness and school success (e.g., see Barrett & Morgan, 1995; Berhenke et al., 2011; Roskes, Elliot, & De Dreu, 2014; Vansteenkiste et al., 2014). The present study will examine the role of negative/withdrawal reactions to failure and pleasure/satisfaction in mastery, within the framework of mastery motivation theory.

Mastery motivation and competence, school readiness. Despite its obvious relevance to school success, mastery motivation has rarely been studied as a school readiness characteristic in early childhood. Some classic studies demonstrated that mastery motivation strongly predicted later competence (e.g., Messer et al., 1986). More recently, Berhenke et al. (2011) studied the *concurrent* relation between instrumental and affective aspects of mastery motivation and school readiness. They found that pride, shame, and persistence positively predicted social competence; persistence and shame positively predicted math skills, and persistence and shame positively predicted reading skills. It was interesting that both pride and shame, observed during mastery tasks, were

positive predictors of social competence and shame was a positive predictor of both reading and math skills. This supports the idea that affective aspects of mastery motivation are important, but is contrary to expectation in terms of the specific role of shame. However, a limitation of this study was its concurrent assessment of both motivation and competence.

Józsa and Molnár (2013), in a cross-sectional study of third and sixth graders, also found a contemporaneous association between instrumental mastery motivation and both GPA and achievement in specific subjects. Similarly, Walker and MacPhee (2011) found that preschool children's instrumental mastery motivation completely mediated the concurrent prediction of their developmental level from their parents' coercive control. Neither of these latter two studies assessed affective aspects of mastery motivation, however, and all three studies of mastery motivation only assessed concurrent relations between mastery motivation and school readiness/success. Additional research using longitudinal assessment of affective and social aspects of mastery motivation is needed, to assess further the ability of these measures to predict later school readiness.

Gilmore et al. (2003) study did assess longitudinally the ability of instrumental aspects of mastery motivation to predict school-related skills. They demonstrated that, for girls only, parentally reported mastery motivation predicted IQ and spelling and reading achievement six years later. Mokrova et al. (2013), like Gilmore at al., studied the longitudinal prediction of kindergarten academic skills (language and math). They did not find a role of gender, but like Gilmore and colleagues, found that instrumental aspects of mastery motivation (persistence) longitudinally predicted both language and math skills. All of these findings are suggestive that mastery motivation may be an important predictor of school readiness and success. However, they do not longitudinally address the role of affective or social aspects of mastery motivation in predicting later school readiness or social/emotional school success, even though extant cross-sectional research suggests that these may be important.

1.1. The present study

The present study, thus, addresses important gaps in the literature: First, we had preschool teachers rate affective aspects of children's mastery motivation, as well as instrumental aspects of mastery of peer relationships (social persistence with peers). Thus, we addressed the multifaceted nature of mastery motivation by examining affective as well as instrumental aspects and by examining a domain of instrumental mastery motivation, peer mastery, which had not yet been studied in relation to school readiness. Second, we followed children longitudinally to grade 2 and then used direct child assessments made at children's schools by trained examiners (who were naive to the preschool ratings) to measure not only math and reading skills, but also social skills at grades 1 and 2. Thus, our study goes beyond the existing literature by obtaining a school-relevant measure of affective and social-instrumental aspects of mastery motivation on a relatively large and representative sample of Hungarian children, following them longitudinally, and studying a larger set of school achievement and school-related skills, as assessed by independent and well-trained members of the research team. We hypothesized that social mastery motivation would predict social competence, but that both negative and positive affective mastery motivation would predict all three school readiness outcomes.

1.2. The Hungarian school system

The present study was conducted in Hungary; thus, to fully understand the context for the findings, it is important to know some basics about the Hungarian school system. Hungarian law guarantees free preschool and kindergarten (all called kindergarten) for all children. There are three years of kindergarten, beginning at age 3 years and continuing until age 6, with some age flexibility (Józsa, Török, & Stevenson, 2018). These grades are labeled Kindergarten 1 (K1), K2, and K3. It is mandatory for children to spend at least 4 hours per day in kindergarten beginning at age 3 (Hungarian Government, 2011); moreover, most of them attend all day. In 2014, 97% of four-year-old children attended kindergarten (OECD, 2016). The National Core Program of Kindergarten Education (Hungarian Government, 2012) defines the programs for all Hungarian kindergartens. This national curriculum can be supplemented with local curricula and programs.

The present study began in K2, which children entered at age 4-5 years of age, although by the time of the study, most were 5 years of age. Thus, although children were "in kindergarten," the context and age of these children was comparable to children in the final year of preschool in the United States.

Table 1
Reliabilities and Descriptive Statistics.

Measure	N of MV	Cronbach's α	Min.	Max.	*M*	*SD*
SES	4	.86	1.00	4.75	2.58	.76
Preschool						
NRF	5	.80	1.00	5.00	2.89	.86
MP	5	.89	1.00	5.00	3.67	.80
SPC	4	.89	1.00	5.00	3.60	.81
IQ	3	.77	64.97	132.95	100.00	15.00
Grade 1						
Reading	3	.71	32.18	94.09	75.31	11.11
Math	4	.81	12.71	95.30	58.12	17.96
Social skills	4	.89	1.86	5.00	4.01	.54
Grade 2						
Reading	3	.79	36.27	91.53	77.27	8.51
Math	4	.86	17.33	97.83	62.94	18.19
Social skills	4	.89	1.86	5.00	4.22	.55

Note. MV = Manifest Variables; NRF = Negative reaction to failure; MP = Mastery pleasure; SPC = Social persistence with children; SES = Socioeconomic status.

2. Method

2.1. Participants

A total of 327 Hungarian children began the longitudinal study at approximately age five ($M = 62.05$, $SD = 4.43$ months). Approximately 49% of the sample was female. The average number of years of parental education was approximately 10.7 years for both fathers and mothers ($SD = 1.79$ for Fathers', $SD = 2.03$ for Mothers'). Children were enrolled in publicly funded kindergarten (preschool) programs a year before the first data collection. We collected data in six small to middle size cities in the southeast part of Hungary. A total of 12 children (0.4% of the sample) was lost to follow-up during the longitudinal study. These children were not significantly different from those in the final sample in terms of any of the predictive variables (All t values (325) < .52, $p > .61$).

2.2. Measures

2.2.1. Dimensions of Mastery Questionnaire (DMQ)

Table 1 presents the measures assessed in this study along with descriptive statistics and reliability. Affective and social mastery motivation were measured using the Teacher report of the *Dimensions of Mastery Questionnaire* (*DMQ*; Morgan, 1997; Morgan, Busch-Rossnagel, Barrett, & Wang, 2009). The *DMQ* assesses mastery motivation by having parents or teachers rate their perceptions of the child's behavior (or school-aged children rate their own

behavior) in mastery contexts on a Likert Scale from 1-5 (not at all typical to very typical).

Prior to its use in this study, the *DMQ* was translated into Hungarian, then back-translated into English and any discrepancies resolved. Then, more than 10,000, mostly typically developing, children rated themselves and/or were rated by their parents and teachers in a validation study (Józsa & Molnár, 2013). In the present study, the Hungarian version of the items assessing social persistence with children (SPC) and mastery pleasure (MP) were used. Examples of items measuring these latent variables are: "Tries to get included when other children are playing" and "Smiles broadly after finishing something", for SPC and MP, respectively.

The *DMQ* also includes items that index shame or sadness-related behavior in response to unsuccessful mastery attempts. There is evidence that withdrawal emotions such as shame or sadness can undermine continued focus and mastery (e.g., Barrett, 1998), so these negative emotions seem particularly problematic to school success. Some of the items we used to index negative reactions to failure/challenge originally were devised to be reversed and included in instrumental scales of the *DMQ;* however, prior research indicated that these items did not have high loadings from the corresponding instrumental mastery motivation factors. Instead, they relate strongly to the negative/withdrawal emotion items and seem best characterized as negative/withdrawal reactions to challenge and/or failure (e.g., DeVellis, 2003; Feifei & Tanner, 2013). We therefore included these items as manifest variables to measure a latent construct that we called "negative reactions to failure/challenge" (NRF). An example item measuring NRF is "Looks down or away when tries but cannot do something". For each of these scales, the construct was the latent variable, and the items for that scale served as manifest variables. So, items were not aggregated into a total scale; rather each item served as a manifest variable for the relevant scale (latent variable). As Table 1 shows, all *DMQ* scales had high reliability in the present sample (Cronbach alphas all > .80).

2.2.2. IQ

The *Raven Coloured Progressive Matrices IQ test* (Raven, Raven, & Court, 1998), administered at preschool, has three sets of matrices A, AB, and B. The three sets are considered as three subscales of the test: A (11 items, Cronbach alpha: .89), AB (12 items, Cronbach alpha: .90), and B (12 items, Cronbach alpha: .88). The overall reliability for the 35 items is .92. The three subscale scores were used as manifest variables in this study, measuring the latent IQ variable. Each IQ score is standardized, with a mean of 100 and a *SD* of 15.

2.2.3. Socioeconomic status

Four manifest variables—mothers' and fathers' education level and teacher and government ratings of disadvantage—were used to assess children's socioeconomic status (SES). Mothers' and fathers' level of education were measured as number of years of school. Disadvantaged status of the child was rated by the preschool teacher and, separately, by the local government, on a 4-point scale (very disadvantaged, somewhat disadvantaged, somewhat advantaged, and very advantaged). The government rating is used to assess need for government support (e.g., free lunch). The correlation of mothers' and fathers' level of education was .58 ($p < .001$). The disadvantage variables were also strongly correlated with each other ($r = .70$, $p < .001$). The two disadvantage variables were moderately highly correlated with mothers' education ($r = .50$, $p < .001$; $r = .49$, $p < .001$) and also moderately correlated with fathers' education ($r = .37$, $p < .001$; $r = .36$, $p < .001$), respectively.

2.2.4. School achievement tests

Table 1 also presents descriptive statistics and reliability for the Grade 1 and 2 achievement assessments. All school achievement scores are based on a 100-point score. The math and reading achievement tests were based on the Hungarian National Curriculum (Hungarian Government, 2011) and were developed by evaluation experts in the field. The tests were different in 1 st and 2nd grades. The math tests included four subtests, and the reading tests three. These subtests were the manifest variables in this study for measuring the latent variables of math and reading achievement. The overall reliabilities for these tests were high (Cronbach alphas – Grade 1: Math .96, Reading .97; Grade 2: Math .95, Reading .98).

2.2.5. Social skills

In addition to measures of achievement in mathematics and reading, we obtained scores on social skills. The social skills test is part of the *DIFER* school readiness/school success test battery that is widely used across Hungary. *DIFER*, which is administered at the child's school, is an acronym for Hungarian words meaning "Diagnostic assessment systems for development" (cf. Nagy, Józsa, Vidákovich, & Fazekasné, 2004, 2016). The standardized tests comprising *DIFER* include seven pre-academic skills, which are administered individually in three face-to-face sessions with the examiner (E). To create the social skills scale for each of these three individual sessions, the examiner rates children's communication and social interactions with E on 1-5 Likert scales. An additional social skills scale is obtained in a peer interaction setting that includes four children who are in the same class at school. In this peer context, E rates children on their communication, social interaction with E, and social interaction with peers, using 1-5 Likert scales. Inter-rater reliabilities for the social skill scales from these four sessions were above .75 for each session and .84 for the total score (Nagy, Józsa, Vidákovich, & Fazekasné, 2016). The social skills ratings in each of the four situations were used as manifest variables in this study. The ratings were carried out in the same manner in 1 st and 2nd grade; however, the examiners doing them were different at the two ages.

2.3. Procedure

The *DMQ* was completed by the preschool (K2) teachers in early October, near the beginning of K2, but after teachers had gotten to know the children. The IQ test was administered at K2 by trained graduate psychology students. The data collection took place in the first quarter of the K2 academic year, in October. Parents were asked about their level of education.

The achievement tests were completed by students during classes in Grade 1 and Grade 2 and results were scored by the research and evaluation team. The math tests were graded by one teacher from the research and evaluation team, and the reading tests were evaluated by a different teacher. Social skills were rated by trained psychology graduate students (who were different at grade 1 and grade 2). Each situation lasted 10–15 minutes. The data collections were in May in both grades. There were about 2.5 years between the 1 st and 2nd data point, and 3.5 years between the 1 st and 3rd data point.

3. Results

3.1. Preliminary analyses

3.1.1. Intercorrelations among variables

The main purpose of this study was to examine the ability of preschool (K2) mastery motivation (mastery pleasure (MP), negative reaction to failure (NRF), and social persistence with children (SPC)) to predict grade 1 and grade 2 reading, mathematics, and social skills, after taking into account IQ and socioeconomic status

Table 2
Intercorrelations for the Variables.

	Measure	1	2	3	4	5	6	7	8	9	10
1.	NRF in Preschool	–									
2.	MP in Preschool	-.41	–								
3.	SPC in Preschool	-.44	.49	–							
4.	IQ in Preschool	-.25	.22	.18	–						
5.	SES	-.19	.19	.17	.37	–					
6.	Reading in Grade 1	-.29	.29	.25	.29	.29	–				
7.	Reading in Grade 2	-.25	.25	.16	.25	.34	.49	–			
8.	Math in Grade 1	-.32	.26	.30	.36	.38	.62	.53	–		
9.	Math in Grade 2	-.21	.17	.11#	.32	.29	.53	.53	.68	–	
10.	Social skills in Grade 1	-.41	.37	.39	.22	.34	.34	.46	.46	.39	–
11.	Social skills in Grade 2	-.34	.35	.32	.20	.34	.41	.49	.48	.46	.84

Note. NRF = Negative reaction to failure; MP = Mastery pleasure; SPC = Social persistence with children; # = Not significant. Unmarked coefficients are significant at $p \leq .01$.

(SES). However, before executing these principal analyses, intercorrelations were run, and strength of correlations of preschool (K2) variables with grade 1 variables was compared to comparable correlations with grade 2 variables. In addition, relative strength of zero order correlations of various predictors with particular outcome variables was also assessed, to see if our model expectations seemed reasonable to pursue. As Table 2 shows, all of the independent variables showed significant low to moderate (0.2-0.3) correlations with reading performance. This correlation was negative for negative reaction to failure, and positive for all of the other variables. Fisher's z-tests comparing the strength of the correlations of predictors with grade 1 versus grade 2 reading indicated no significant differences.

For mathematics, a similar correlational pattern emerged. The independent variables' relations to first and second grade performance were of similar strength, with one exception: the correlation between social persistence with children and second grade mathematics performance was lower, and was not significant. This is the only correlation that was not significant in the entire matrix.

The social skills outcome variable showed a correlational pattern similar to those of reading and mathematics, in that relative correlations with grade 1 and grade 2 were similar. However, there were differences among predictors in strength of correlation with this variable. Socioeconomic status showed a significantly stronger correlation with social skills than IQ did (grade 1: $z = 2.03$, $p = .02$, grade 2: $z = 2.37$, $p < .01$). Mastery motivation variables (mastery pleasure, negative reaction to failure, social persistence with children) were also more strongly related to social skills than IQ was (grade 1: MP $z = 2.31$, $p = .01$, NRF $z = 3.02$, $p < .01$, SPC $z = 2.57$, $p < .01$; grade 2: MP $z = 1.99$, $p = .02$, NRF $z = 1.86$, $p = .03$, SPC $z = 1.78$, $p = .04$). These findings support our expectation that IQ would not strongly predict social skills.

The strongest correlations were found among the dependent variables, supporting the concept that all are measuring early school success, and that school success is relatively stable. The correlation between the two grades for reading was 0.49, for mathematics 0.68, and for social skills 0.84. Social skills were similarly related to mathematics and reading, the coefficients being around 0.4. The correlation between math and reading was 0.63 in grade 1, and 0.52 in grade 2.

In general, we can conclude that there were significant, small-to-moderate correlations between independent and dependent variables. The relations of independent variables to grade 2 variables and to grade 1 variables were of similar strength, indicating that the relationship of preschool variables to the school skills did not weaken with time. The main analyses assessed how our model of latent preschool variables together predicted school related skills at grade 1 and grade 2, and whether the relation of preschool predictors to grade 2 performance was indirect (through grade 1 school performance).

Table 3
Model Fits of the Measurement Models.

Model	χ^2	*df*	*p*	RMSEA	CFI	TLI	SRMR
Preschool							
5 factors [a]	437.81	195	<.01	0.060	0.932	0.920	0.059
3 factors [b]	1041.91	182	<.01	0.120	0.754	0.717	0.087
1 factor	1987.90	209	<.01	0.161	0.505	0.453	0.132
Grade 1							
3 factors [c]	92.43	41	<.01	0.061	0.971	0.961	0.047
1 factor	522.06	44	<.01	0.182	0.729	0.661	0.126
Grade 2							
3 factors [c]	82.03	41	<.01	0.055	0.979	0.972	0.036
1 factor	687.93	44	<.01	0.212	0.673	0.591	0.131

Note. a = factors are negative reaction to failure, mastery pleasure; social persistence with child, socioeconomic status, IQ; b = factors are mastery motivation total, socioeconomic status, IQ, c = factors are math, reading, social skills. Each factor loading was significant ($p \leq .01$).

3.1.2. Measurement models

The focus of our study was on how preschool (K2) affective and social mastery motivation predicted school outcomes, over and above any roles of IQ and SES. Structural equation modeling (SEM) was utilized to examine the ability of 5 latent predictor variables: mastery pleasure, negative reaction to failure, social persistence with children, IQ, and SES, to predict three school skill latent variables: reading achievement, math achievement, and social skills. Every latent variable was measured by 3-5 manifest variables, and the same constructs were measured at grade 1 and grade 2 (see Table 1).

Mplus, version 7.31, was used for data analysis (Muthén & Muthén, 2010). The model was tested utilizing full maximum likelihood estimates. To analyze model fit, based on Brown's (2006) and Schreiber, Stage, King, Nora, and Barlow's (2006) work, we considered the following goodness-of-fit indicators: χ^2, RMSEA, CFI, TLI and SRMR. Following Hu and Bentler (1999), we regarded the model as having an acceptable fit if the following conditions were met: RMSEA and SRMR ≤ 0.06, CFI and TLI ≥ 0.90.

Before conducting the principal analyses using the planned latent and manifest variables, we used confirmatory factor analyses (CFA) to test the factorial structure of the measurement models for latent and observed variables (see Table 3). We tested the measurement models for the predictive variables, and also for the 1 st grade and 2nd variables. All of the manifest variables fit well in these models.

In case of the predictive variables we tested three measurement models. Based on the literature we expected five predictive variables: negative reaction to failure, mastery pleasure; social persistence with child, socioeconomic status, and intelligence. We also tested a three factor measurement model, where the mastery motivation manifest variables (negative reaction to failure, mastery pleasure; social persistence with child) all were predicted by the same latent variable. Finally, we tested a one factor measurement

model where all of the predictive manifest variables belonged to the same latent variable. Neither the one factor nor three factor model fit the data well (see Table 3). However, as expected, the five factor model fit the data well. Moreover, the five factor model fit the data significantly better than the one factor (χ^2_{diff} (14) = 1540.48, p ≤ .01), and the three factor models (χ^2_{diff} (3) = 605.9, p ≤ .01).

We tested the same two measurement models for dependent variables in first and second grades. In one of these models we assumed three latent variables (math, reading, social skills). In the other model all of the school manifest variables were predicted by one latent variable (school success). The three factor models fit the data well in both grades, but the one factor models did not. Moreover, the three factor models fit the data significantly better than the one factor models both in the 1 st grade (χ^2_{diff} (3) = 429.63, p ≤ .01), and the 2nd grade (χ^2_{diff} (3) = 605.9, p ≤ .01).

Based on the literature, in conjunction with the fit statistics of the measurement models, we therefore used five latent predictive variables and three latent outcome variables for the principal analyses in this study.

3.2. Principal analyses

Our hypotheses were tested using a series of four analyses. For every model tested, the hypothesis was that preschool variables predict first- and second grade school outcomes. We separately examined prediction of math, reading, and social skills, and then also tested a model predicting all three of these school success variables.[1]

On the basis of the literature, we assumed that IQ (Crosnoe & Benner, 2015) and SES (Duncan et al., 2015) would predict reading and math achievement, so we included them as predictors of these two outcomes in addition to the focal latent variables involving affective mastery motivation. We did not expect social persistence with peers to predict these cognitive outcomes, so this variable was omitted from these two models.[2] In contrast, we expected all three mastery motivation latent variables, especially social persistence with children, and SES to predict social skills (e.g., Denham et al., 2014; Fishbein et al., 2016), but we did not expect IQ to do so, so this was omitted from the model[1]. Our approach was to use only the simpler model, with *a priori* predictors in it, as the final model unless adding the other predictor significantly improved the model. In each case, our hypothesized model fit at least slightly better than the alternative model. However, we included all 5 preschool measures in an additional model predicting all three outcomes. See Figs. 1–4 for details.

We hypothesized that preschool variables would predict first grade performance, which, in turn, would predict second grade performance. However, we first tested whether preschool variables directly predicted both first- and second-grade school outcomes. Results indicated that, in all cases, the best fit model held when preschool variables indirectly predicted second-grade variables, through first grade variables. For this reason, we only discuss these predicted models.

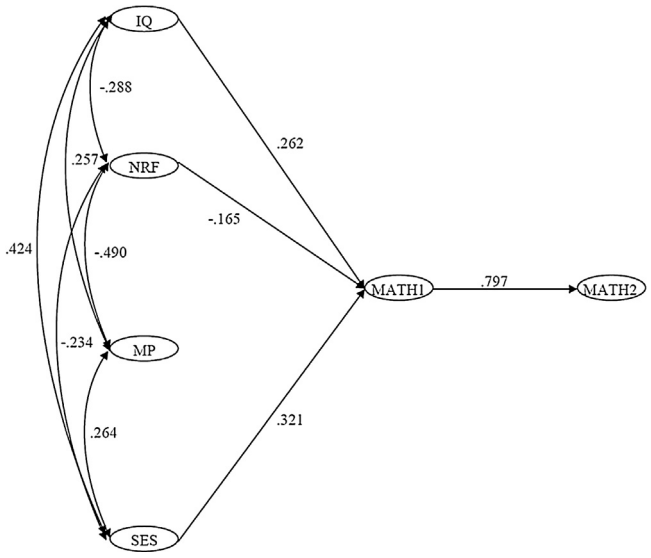

Fig. 1. Standardized coefficients for the Math Model. Latent constructs are shown in circles. NRF = Negative reaction to failure; MP = Mastery pleasure; SES = Socioeconomic status; MATH1 = Math achievement in grade 1; MATH2 = Math achievement in grade 2.

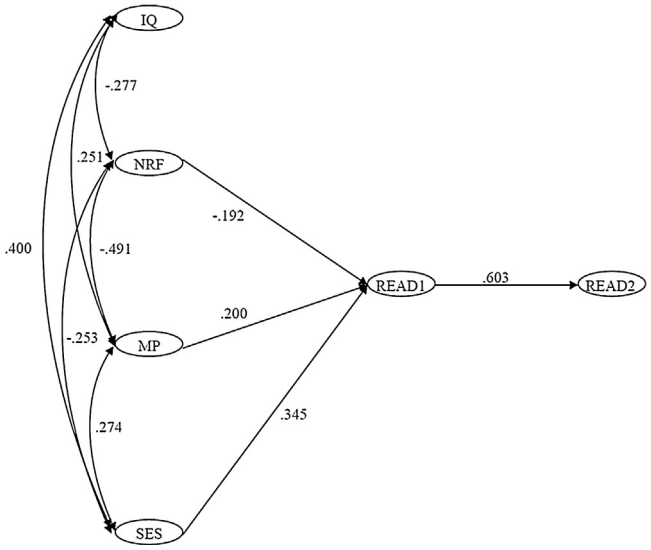

Fig. 2. Standardized coefficients for the Reading Model. Latent constructs are shown in circles. NRF = Negative reaction to failure; MP = Mastery pleasure; SES = Socioeconomic status; READ1 = Reading achievement in grade 1; READ2 = Reading achievement in grade 2.

3.2.1. Math Achievement

The model predicting math achievement from preschool mastery motivation, IQ, and SES fit well (see Table 4). Children's IQ (β = .26, p < .01) and SES (β = .32, p < .01) significantly and positively predicted math achievement, while negative reactions to failure was a significant, negative predictor (β = −.16, p < .05). Mastery pleasure did not significantly predict math achievement. First grade math performance strongly predicted second-grade math performance (β = .80, p < .01; Fig. 1).

[1] We ran multilevel linear models to test the effect of students' classes on the results. The analyses with students nested in classrooms showed no nested effects of the predictors. The nesting did not account for nor qualify the effects of predictors; therefore, we did not include the classroom variable in the SEMs.

[2] We also ran the SEM models with both social persistence and IQ included in the separate math, reading, and social skills models, but social persistence did not contribute to predicting math or reading; nor were the models with social persistence notably better fitting, (math: RMSEA = .050, CFI = .941, TLI = .934, SRMR = .057, and χ^2 (359) = 650.47, p ≤ .01; reading: RMSEA = .054, CFI = .929, TLI = .919, SRMR = .060, and χ^2 (306) = 600.25, p ≤ .01). Similarly, IQ did not contribute to predicting social skills; nor was the model fit improved significantly by including IQ (RMSEA = .051, CFI = .954, TLI = .947, SRMR = .056, and χ^2 (328) = 611.16, p ≤ .01), so we only discuss here the simpler models. The simpler models fit the data better in the case of math (χ^2_{diff} (120) = 193.48, p ≤ .01) and reading (χ^2_{diff} (110) = 182.35, p ≤ .01); there was no significant difference between the two model fits in the case of social skills (χ^2_{diff} (70) = 76.87, p = .27).

Table 4
Model Fits of the Measurement Models.

	Model	χ^2	*df*	RMSEA	CI	CFI	TLI	SRMR
1.	Math	501.15	262	0.053	0.046 – 0.060	0.941	0.932	0.055
2.	Reading	464.67	217	0.059	0.052 – 0.066	0.923	0.910	0.061
3.	Social skills	534.29	258	0.057	0.050 – 0.064	0.953	0.945	0.058
4.	Total	1383.83	825	0.046	0.041 – 0.050	0.935	0.929	0.070

Note. Each factor loading is significant at $p \leq .01$. All models use SES, IQ, negative reactions to failure (NRF), and mastery pleasure (MP) as predictors. Social skills 2 and Total 2 models also include social persistence with children (SPC). CI = 90% confidence intervals for the RMSEA.

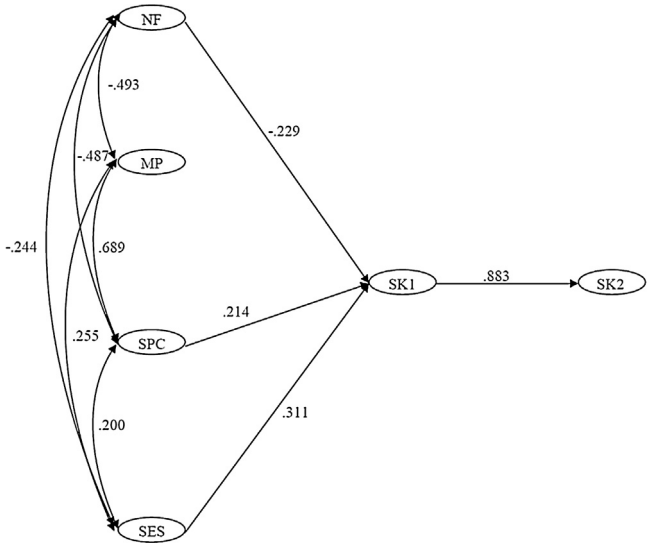

Fig. 3. Standardized coefficients for the Social skills Model. Latent constructs are shown in circles. NRF = Negative reaction to failure; MP = Mastery pleasure; SPC = Social persistence with child; SES = Socioeconomic status; SK1 = Social skills in grade 1; SK2 = Social skills in grade 2.

3.2.2. Reading Achievement

The reading model also fit well (see Table 4), but a somewhat different pattern emerged. IQ did not significantly predict first-grade reading achievement, while SES (β = .35, p < .01) and mastery pleasure (β = .20, p < .01) both had significant, positive coefficients. Negative reactions to failure's coefficient was significant and negative, as it was for mathematics (β = –.19, p < .05). The relation between first- and second grade reading was strong (β = .60, p < .01; Fig. 2).

3.2.3. Social Skills

The third model predicted social skills, and again fit well (see Table 4). It was assumed that social persistence with peers would be an important predictor of the development of social skills (Barrett & Morgan, 1995), and, in fact, the SPC variable significantly and positively predicted first-grade social skills (β = .21, p < .01). The coefficient for SES (β = .31, p < .01) was also significant. Negative reaction to failure negatively predicted social skills (β = –.23, p < .01), but mastery pleasure did not significantly predict social skills in this model. The relationship between first- and second-grade social skills was quite high (β = .88, p < .01).

3.2.4. Total Model

In the fourth model, we included reading, mathematics and social skills as dependent variables in one complex model, and preschool predictors included all five available variables (Fig. 4). IQ significantly contributed to predicting mathematics (β = .23, p < .01) and reading (β = .16, p < .01) in this model. SES significantly predicted all three dependent variables (Math β = .36, p < .01, Reading β = .40, p < .01, Social skills β = .37, p < .01). Negative reactions to failure significantly and negatively predicted all three vari-

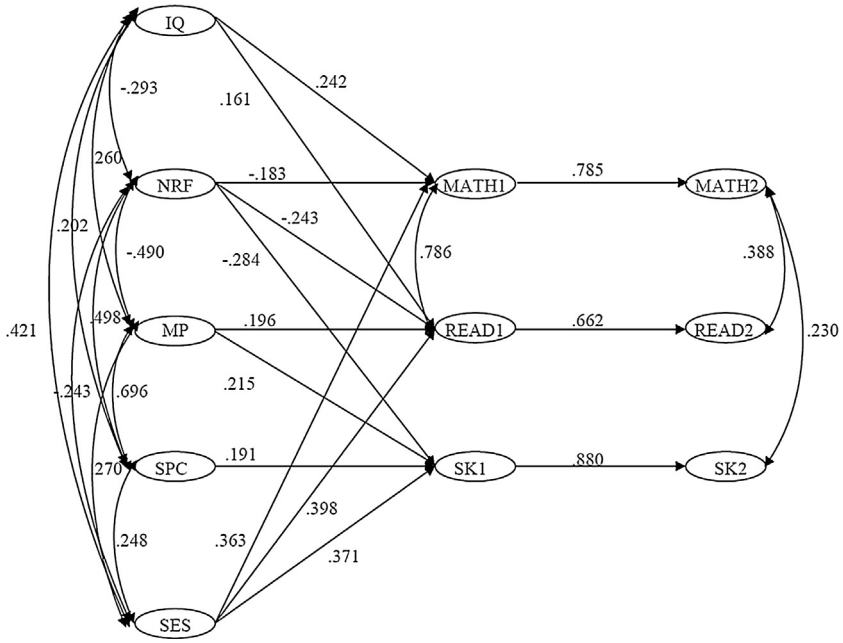

Fig. 4. Standardized coefficients for the Total Model. Latent constructs are shown in circles. NRF = Negative reaction to failure; MP = Mastery pleasure; SPC = Social persistence with child; SES = Socioeconomic status; MATH1 = Math achievement in grade 1; MATH2 = Math achievement in grade 2; READ1 = Reading achievement in grade 1; READ2 = Reading achievement in grade 2; SK1 = Social skills in grade 1; SK2 = Social skills in grade 2.

Table 5
Variance Explained in the Models (R^2).

Model		Grade 1			Grade 2		
		Math	Reading	Social skills	Math	Reading	Social skills
1.	Math	.37	–	–	.64	–	–
2.	Reading	–	.36	–	–	.36	–
3.	Social skills	–	–	.38	–	–	.78
4.	Total	.41	.50	.43	.62	.43	.77

ables (Math β = –.18, p < .05, Reading β = –.24, p < .01, Social skills β = –.28, p < .01). Mastery pleasure positively contributed to predicting reading (β = .20, p < .01) and social skills (β = .21, p < .01), and SPC predicted social skills (β = .19, p < .01).

We summarize the models' explained variance in Table 5. The tested models explained about 40% of variance in all of the three school outcomes variables in grade 1. In the case of reading, the explained variance was about the same in grade 2 as in grade 1, approximately 40%. However, it was higher in 2nd grade in the case of the other two dependent variables. The explained variance is about 60% for math in all of the three models, and 78% for social skills in all of the four models in 2nd grade.

4. Discussion

The results of this relatively large, longitudinal study support the utility of examining socioemotional aspects of mastery motivation, such as social persistence with peers and affective aspects of mastery motivation, as school readiness dimensions. Social persistence with peers significantly predicted social competence in the early grades, and social competence is known to predict positive school and life outcomes (e.g., Jones et al., 2015). Moreover, negative reactions to failure (NRF) predicted all three school achievement measures, over and above the contribution of SES and IQ, and mastery pleasure predicted both reading and social skills. In fact, although negative reactions to failure consistently predicted all measures of early school skills and achievement, IQ only predicted math and reading achievement. Our NRF variable does not seem to be best understood as frustration tolerance, in that it is not strongly correlated with other DMQ items measuring angry/frustrated responses to mastery. It is more likely related to inclination to become sad and/or ashamed and, thus, to give up/withdraw from mastery attempts. Moreover, we view it as a malleable propensity, rather than as temperament, as traditionally conceptualized, and there is some evidence that it can be modified (Chia, Keng, & Ryan, 2016). However, further research is needed to assess whether it is, as predicted, responsive to intervention.

Of the other predictors, only SES predicted all three measures, replicating the known tendency for children whose parents are less educated and who have fewer material resources to perform at lower levels in school. Moreover, the preschool variables predicted the grade two school skills indirectly, through their impact on first grade skills. The results suggest that children's tendency to respond negatively to and to avoid difficult achievement tasks may undermine not only their concurrent performance in school, but also future skills. This highlights the importance of measuring such negative reactions early in development and intervening in early childhood classroom and/or home environments to address them before they can importantly contribute to negative developmental cascades.

This finding complements earlier evidence that positive Approaches to Learning, such as mastery motivation, can help compensate for less-than-optimal learning environments (Meng, 2015). It appears that, in addition, negative Approaches to Learning, in the form of negative withdrawal emotions in response to unsuccessful mastery attempts, can add to the negative impact of low SES, further undermining school success in math, reading, and social competence. These attitudes and motivation toward learning, may be as important as Social Emotional Learning or Socioemotional Competence characteristics, such as emotion understanding, social skills, and ability to effectively regulate emotions, in contributing behaviorally to school readiness and school success.

Our findings also provide further support for the conclusion that disparities in Socio-Economic Status (SES), can undermine school success, potentially leading to continued stratification of educational opportunity and attainment (Duncan et al., 2015; Józsa, 2016), and that Approaches to Learning can impact these outcomes. They also support the conclusion that IQ differences are not the most important factor in such disparities, providing hope that environmental support for other factors, such as mastery motivation, might have an important and long-lasting impact on such differences.

Unfortunately, mastery motivation, especially affective and social aspects of mastery motivation, is almost never adequately assessed currently. Although is now clear that non-academic school readiness skills, such as executive functions and social-emotional competence, play important roles in school success (e.g., Denham et al., 2014; Bierman & Torres, 2016), less attention has been paid to motivational influences such as enthusiasm, persistence, and other aspects of mastery/competence motivation, which may be just as important (e.g., Hyson, 2008; McDermott et al., 2012). The seminal report "From Neurons to Neighborhoods" specifically highlighted mastery motivation as a key domain of development (Shonkoff & Phillips, 2000). The present research suggests that negative reactions to failure, mastery pleasure, and social mastery motivation are particular domains of mastery motivation that also are worthy of assessment as school readiness variables.

Findings from our study are potentially especially important given the consistent finding from decades of research, across a number of cultures, that mastery motivation decreases from elementary school through high school. Many have suggested that mastery motivation might be undermined by current school environments, which typically emphasize external signs of performance such as grades, rather than focusing on trying hard and improving (e.g., Józsa & Morgan, 2014; Józsa, Wang, Barrett, & Morgan, 2014; Gottfried, Marcoulides, Gottfried, & Oliver, 2013; Harter, 1981; Lepper, Corpus, & Iyengar, 2005). Thus, if mastery motivation is an important predictor of success in school, it will be important to implement early interventions to better support its development during the school years. There is evidence that early interventions can increase mastery motivation (e.g., Hashmi et al., 2017; Vansteenkiste et al., 2004), so if interventions were implemented in the early grades, this could potentially decrease the decline and increase later achievement.

The present study highlights the need to include social/emotional aspects of mastery motivation in both school readiness assessments and universal interventions, to try to change this potentially harmful decline. It highlights the potential for interventions that foster mastery motivation to increase school performance, even in children who are at risk for lower performance due to lower SES (e.g., Hashmi et al., 2017; Steuer, Rosentritt-Brunn, & Dresel, 2013; Vansteenkiste et al., 2004). In

particular, helping children to persist in the face of challenge rather than feeling defeated and withdrawing could be key to helping children become and remain positively engaged in school. Results point to the importance of working to reverse the current trend for school experience to be negatively related to children's mastery motivation (e.g., Józsa et al., 2014). The study adds to the growing literature highlighting the importance of socioemotional skills and Approaches To Learning (ATL) for school readiness.

Although this study had a number of strengths, including a relatively large sample that was studied longitudinally, access to a representative sample of public school children, and multiple, direct, child-assessed measures of school skills and achievement, it did have several limitations. First, the measure of mastery motivation was reported by teachers, rather than directly assessed in the children. Thus, it is possible that teachers' reports were biased in some manner or were affected by teachers' relationships with the children they rated. However, different teachers rated children's mastery motivation in K2 and graded their achievement in grades 1 and 2, so the relation between teacher-reported measures in K2 and grade 1 and 2 achievement could not have been because the same person's biases entered into both assessments. Similarly, the social skills test was directly assessed on children by individuals who were not teaching staff, so the relation of mastery motivation to these scores held despite differing methods of assessment by completely independent individuals. Thus, there is every reason to believe that results were accurate, rather than artifacts of teacher biases.

5. Conclusions

Results contribute to a growing literature that highlights the importance of behavioral *attitudes or propensities*, including social and emotional Approaches to Learning, as dimensions of school readiness, over and above the role of pre-academic skills and social and emotional *competence* (e.g., Denham et al., 2014; Kagan, Moore, & Bredekamp, 1995). Although there is a robust literature examining the role of executive functions in school readiness (e.g., Beck, Schaefer, Pang, & Carlson, 2011; Ng, Tamis-LeMonda, Yoshikawa, & Sze, 2015), the present study demonstrates the importance of an Approach to Learning that has received surprisingly little attention, mastery motivation. In particular, it highlights the importance of social and emotional aspects of mastery motivation. Additional research is needed to assess whether these same findings hold for direct measures of mastery motivation in children, including measures of their mastery-related emotional responses.

Research is also needed to examine the relative role of social and affective aspects of mastery motivation and executive functions in school readiness. These two areas of school readiness are potentially bi-directionally related, in that if one is unable to exercise inhibitory control, working memory skills, and cognitive switching skills while attempting a task, one would be likely to find the task less rewarding and would be more likely to withdraw from the task or give up. Similarly, if one is not motivated to do the task, then executive functions are likely to appear to be poor because one will not try hard to exercise those skills. As indicated earlier, when they were distinguished, instrumental mastery motivation was found to mediate executive functions' prediction of school skills. How do social and affective aspects of mastery motivation and executive functions jointly predict later academic and social-emotional aspects of school readiness?

It also would be interesting to conduct further longitudinal research that includes relevant pre-academic, executive functions, and/or social-emotional skill preschool measures as predictors, in addition to social and affective aspects of mastery motivation. This would better enable us to determine the role of motivation over and above other, skill-based school readiness measures.

In addition, it will be important to study the role of mastery motivation as a school readiness dimension in other countries and cultures, since the present study only examined mastery motivation in Hungarian children. Finally, longer-term follow-up is needed to assess the long-term impact of mastery motivation across the school years.

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