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Exploring the Presence of Matthew Effects in Learning Disabilities

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Matthew effects originate in Matthew's Gospel, which states, "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (Matthew 25:29). In simple terms the above phrase has often been summarized as, "The rich get richer, and the poor get poorer" (Stanovich, 1986; Walberg & Tsai, 1983).

Researchers have noted repeatedly that some children come to school somewhat "wealthier" than their peers when it comes to early reading skills. As time goes by, those students who start out with some literacy advantages tend to thrive and grow academically, whereas their less fortunate peers tend to get left behind. Like the line in Matthew's Gospel, the rich students get richer and the poor students get poorer. Hence, in 1983, Walberg and Tsai first coined the term the "Matthew effect" to describe the fact that, without intervention, some students rapidly develop and build on strong literacy foundations, and other students languish behind their more fortunate peers. This idea has been tested in the growth patterns of students with reading and other disabilities and has received strong, but not universal, support (e.g., Kieffer, 2008; Leppanen, Niemi, Aunola, & Nurmi, 2004; Shaywitz et al., 1995).

The topic of Matthew effects in learning disabilities (LD) is important for several reasons: (a) the idea of Matthew effects has received some empirical support but not across subject matters (mostly in reading), (b) the empirical knowledge base on the patterns of growth for students with LD is not clear, (c) the methodology of longitudinal studies and designs is important, and we need to make a stronger case for them, (d) it relates to the current issues of responsiveness to treatment, as the Matthew effect is directly related to the "responding" aspect of that model, (e) the current analytical advances (e.g., multilevel modeling) allow for a better estimation of those effects, (f) the predictive validity of individual predictors of growth in reading has not been ascertained, (g) methods to account for regression to the mean and other artifacts are now available in this line of research (e.g., value-added models, Marsh), and (h) a focus on international contributions may assist us in seeing the broader picture of these effects worldwide. This special issue has purposely included research groups across the world with contributions coming from the United States,

Canada, England, the Netherlands, Finland, and Greece. Thus, this topic contributes worldwide information regarding research, practice, and advocacy, as the authors emphasize the implications of their research findings for practice and advocacy (where appropriate).

Thus, the purpose of this special issue is to provide current evidence regarding the presence of Matthew effects in LD across subject matters (e.g., reading, mathematics, vocabulary, etc.) using international groups of researchers. Their works are briefly described below.

Cain and Oakhill report their results from a longitudinal study on the reading development of children between 8 and 16 years old over a 4-year period in England. They looked at the growth of reading comprehension, word reading accuracy, and vocabulary knowledge over time. More specifically, they looked into the relationship between comprehension and accuracy in vocabulary growth. With regard to reading comprehension, the authors observed that students with low reading comprehension made significantly smaller gains in vocabulary knowledge over time compared to high comprehenders. This pattern of responding is depicted by a significant interaction between group and time in a mixed-model ANOVA. Thus, the pattern of Matthew effects is evident with regard to the effects of reading comprehension on vocabulary only. When word accuracy and reading comprehension were the dependent variables, no significant interactions were observed (and hence there was an absence of the Matthew effect pattern). As the authors point out, their relatively small sample sizes might be responsible for the nonsignificant effects; however, the significant ones are rather robust given the respective *n* sizes. Interestingly, the authors generalized the pattern of Matthew effects with broader reading skills such as students' performance on literacy tasks. Their study provides unique information with regard to the predictive ability of a wealth of variables (e.g., print exposure) after controlling for relevant confounds (e.g., cognitive ability).

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Luyten and ten Bruggencate analyze a large sample of 1,100 Dutch students whom they followed from age 4 to age 12. Every 2 years the authors implemented standardized assessments of language and mathematics and then projected students' trajectories of growth by equating their scores (at different waves) using item response theory modeling. Their analytic methodology allowed for a distinction of students' variance at both the individual level and the school level. As the authors nicely put it, individual growth trajectories of students would be rather meaningless if they contradicted trajectories of growth at the school level (the individual effects would be likely "washed out"). This is why the authors fit a three-level model with observations within students nested in between-student characteristics and those were nested within school-level variables. The authors nicely control for a range of variables such as grade repetition and address two types of Matthew effects: a general one and the so-called socioeconomic Matthew effect. The general Matthew effect was defined by low intercepts and flat trajectories of growth for students when modeling their individual growth patterns. The presence of the socioeconomic Matthew effect was tested by comparing growth patterns of students belonging to low- and high-SES schools. Results indicate that disadvantaged students defined by low sociometric factors (e.g., parent's education) grew by significantly lower rates compared to students from high-SES backgrounds. This is more in line with minority student groups in the Netherlands. Thus, the gap for low achievers increased, even when no significant differences existed at the start of their schooling. Furthermore, some early gender differences went away with time. Their study supports a conclusion in favor of Matthew effects in language, primarily resulting from socioeconomic factors related to the schools (e.g., presence of large numbers of minority students) and the students (e.g., parents' education).

Morgan, Farkas, and Wu use data from the Early Childhood Longitudinal Study–Kindergarten Cohort to estimate reading and mathematics achievement growth trajectories for 12,587 children from kindergarten through fifth grade. The authors estimated separate trajectories for those children identified in kindergarten as having (a) LD ($n = 47$), (b) speech or language impairments ($n = 285$), or (c) no identified disabilities ($n = 12,255$). They then went on to estimate the effects of sociodemographic (e.g., social class, gender, race) and educationally relevant (e.g., frequency of the child's attention, whether the child repeated kindergarten, etc.) predictors of children's initial reading and mathematics achievement as well as their growth rates. Using multilevel modeling with a large number of covariates (e.g., students repeating grade, etc.), the authors show that most students displayed steady skill growth in reading and mathematics over time. However, children with LD or specific language impairments began kindergarten displaying lower achievement in each domain and made less

progress over time than those without disabilities, suggesting the presence of the Matthew effects pattern described earlier. Furthermore, students with LD consistently fared less well than children with specific language impairments as evidenced by significant initial differences (in intercepts) and trajectories of growth over time (slopes). Thus, for students with LD, there was a full manifestation of the theses of the Matthew gospel across both reading and mathematics.

McNamara, Scissons, and Gutknecht conducted a longitudinal study to estimate the trajectories of growth in reading of 382 students from kindergarten to Grade 3 in Canada. In their applied study, children were screened during kindergarten with assessments of phonological awareness and letter-sound understanding. Using percentile rank scores, children were identified as having strong or weak prereading profiles. Results indicate a full manifestation of the Matthew model in reading. The between-group variance observed at early time points was increased later on (a significant indicator of the Matthew model), and there were between-group significant differences over time, across all time points. Differences over time not only were significant but also accounted for large amounts of variance in reading (at times 36% of the variability in the dependent variable was the result of the factor—grouping). Thus, the findings from their study suggest that students who have a bad start in phonological awareness develop reading ability at much slower rates.

Niemi et al. looked at the growth patterns of 1,285 Finnish children from kindergarten through Grade 1 within the framework of responsiveness to treatment. A total of 104 students were initially identified as having slow reading patterns (in letter knowledge, phonological awareness, and counting skills) and were compared with three groups with more ability defined using various levels of skill (defined using various patterns of deviations from the mean). The authors employed measures of motivation accounted for the effects of their parents (e.g., parents' reading and math ability). After controlling for these factors and cognitive ability, the results of motivation washed out. When looking at the trajectories of growth for the low-skilled group, results indicated that there was a small percentage of students who presented themselves with a flat developmental pattern in both reading and math, suggesting the presence of Matthew effects across both subjects. Interestingly, this poor pattern of growth was strongly predicted by parents' respective problems with the subject matters and prereading skills. Nevertheless, Matthew effects were present for the low ability group.

Last, Sideridis, Simos, Mouzaki, Protopapas, and Morgan tested whether Matthew effects are present in students with or without low language ability with regard to reading comprehension. A total of 580 Greek elementary school students were tested on various standardized measures of language and ability in a 3-year (six-wave) longitudinal study. Based on a series of growth curve and

random-intercept models, results suggested a partial manifestation of the Matthew effects proposition; that is, either significant differences were observed at the start of the study followed by nonsignificant growth trajectories, or vice versa (nonsignificant intercepts were followed by significantly different trajectories of growth). The ability groups were defined by low or high scores on spelling, decoding, fluency, and vocabulary. Although the fan spread pattern was not evident, there was significant support for the Matthew model when examining the trajectories of growth among different ability groups. For all independent variables, there were significant between-group differences at the beginning of the study (significant intercepts), favoring the high ability groups (e.g., high in spelling, fluency, etc.). However, the presence of nonsignificant slopes suggested that the initial differences between groups never decreased. Thus, the gap remained over time. A significant exception was with regard to the role of vocabulary, for which there was a full manifestation of the model with the low ability group presenting a significantly lower trajectory of growth compared to the high vocabulary group. Thus, as with the other studies, Matthew effects were present in reading comprehension.

Concluding Remarks

The general premise of the Matthew effects model lies on the assumption that early learning facilitates subsequent learning. Thus, the expectation is that different ability groups display divergent trajectories of growth over time. The purpose of the present special issue was to advance our knowledge base on the presence of Matthew effects by including international studies that involved a wealth of variables not tested earlier (e.g., the socioeconomic Matthew effect, parent variables, student motivation, etc.). Across studies, the generalized findings are that Matthew effects are present in LD and that disadvantaged students continue to be at a great disadvantage in the future. This finding was evident particularly with regard to the relationship between vocabulary and reading comprehension

(Oakhill & Cain; Sideridis et al.) as well as with regard to other reading skills such as phonological awareness (McNamara et al.) or math abilities (e.g., Morgan et al.; Niemi et al.). When looking at the framework of responsiveness to instruction implemented in the United States and various parts of the world, the message from the present studies is clear: Students with LD are likely to be classified as nonresponders as their trajectories of growth suggest. We need to switch our attention from assessing the difficulties of students with LD to how to intervene to solve their problems. We know far more about assessing students than about intervention. Unless we quickly become effective in the latter, the Matthew effects model will continue to gain strong support.

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