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Learning difficulties, academic well-being and educational dropout: A person-centred approach ☆

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ABSTRACT

The aim of this study was to examine lower secondary students' ($N = 1152$) academic performance (reading and mathematics) and well-being (academic self-concept, perceived learning difficulties and school burnout) profiles, as well as the relations among these profiles and educational dropout. Latent profile analysis was used to identify four groups of students with distinct academic performance and well-being profiles. Students from two groups, namely the low-performance and negative academic well-being groups, were more prone to school dropout, whereas students from the high-performance and average-performance groups were less likely to abandon secondary education. Implications for research on learning difficulties are discussed, as the results demonstrate strong relations between mathematics, reading and spelling in this age group.

1. Introduction

Low academic achievement has been identified as the single most important predictor of educational dropout (Battin-Pearson et al., 2000). However, it remains unclear if educational dropout is mainly connected to the level (severity) or type (reading, math or comorbid difficulties) of learning difficulties. Furthermore, the connection between mathematics and reading is not yet fully understood (Andersson, 2010; Vukovic, 2012), and research concerning adolescent students is scarce (Korhonen, Linnanmäki, & Aunio, 2012). However, another important factor related to educational dropout is low academic well-being (Janosz, LeBlanc, Boulerice, & Tremblay, 2000). This study aims to investigate the relations between learning difficulties, academic well-being and educational dropout using a person-centred approach at the end of the comprehensive school.

1.1. Educational dropout

Dropout from education has far-reaching negative consequences on an individual level. Individuals who drop out of education are more likely to be unemployed (Sum, Khatiwada, McLaughlin, & Palma, 2009), have a lower income level (Levin, Belfield, Muenning, & Rouse, 2007; Rumberger & Lamb, 2003) and experience lower levels of general well-being (Bynner & Parsons, 2002; Lamb, 2011). In addition to these costs to individuals, there are also social costs associated with increased welfare needs and reduced taxation revenue (Owens, 2004).

As graduation from secondary education is currently viewed as the minimum level of educational attainment for the successful inclusion of young people into society, it is important to identify at-risk groups already present in comprehensive education. Converging evidence suggests that the single most important predictor of dropout is low academic achievement (Battin-Pearson et al., 2000; Janosz, LeBlanc, Boulerice, & Tremblay, 1997; Janosz et al., 2000), which is often related to lower socio-economic background of students' families (Duncan & Brooks-Gunn, 2001; Fall & Roberts, 2012). A large body of research has also determined that students classified as having low academic well-being face a higher risk of dropping out of education (Archambault, Janosz, Morizot, & Pagani, 2009; Fall & Roberts, 2012; Fortin, Marcotte, Potvin, Royer, & Joly, 2006; Janosz et al., 1997, 2000). However, to our knowledge, previous studies have not investigated whether different subtypes of learning difficulties differentially influence educational dropout.

1.2. Learning difficulties in mathematics and reading

Many students have problems in attaining normal achievement in both reading and mathematics (Dirks, Spyer, van Lieshoult, & de Sonneville, 2008; Light & De Fries, 1995). A traditional and widely used approach to define subtypes of learning difficulties is to divide students into those with reading difficulties only (RD only), those with mathematical difficulties only (MD only) and those with combined difficulties (MDRD) (Andersson, 2010; Andersson & Lyxell, 2007; Jordan,

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Hanich, & Kaplan, 2003; Vukovic, Lesaux, & Siegel, 2010). Even though arguments have been made for qualitatively different subtypes of learning difficulties (LD) (e.g., Murphy, Mazzocco, Hanich, & Early, 2007), the appropriateness of this classification system has been questioned (Fletcher, Lyon, Fuchs, & Barnes, 2007; Fuchs et al., 2009; Mazzocco, 2007). Indeed, a growing body of research argues that the differences between the subtypes are more quantitative in nature than qualitative (LeFevre et al., 2010; Vukovic, 2012).

For example, a seminal study by Dirks et al. (2008) showed that changing the cut-off value in reading and mathematics measures resulted in different students being identified as having RD, MD and MDRD. If the cut-off values in reading and mathematics used were more stringent, students from the MDRD group were identified as RD only or MD only, and consequently, students from the RD-only and MD-only groups were identified as typically achieving students. Furthermore, students in the MDRD group in the above-mentioned studies (Andersson, 2010; Dirks et al., 2008; Jordan et al., 2003) tended to have more severe difficulties in all reading- and math-related measures compared to the RD-only and MD-only groups. Interestingly, the MD-only and RD-only groups have been found to perform at the same level on word problem tasks and significantly better than the MDRD group, but are not as proficient as the typically achieving students are (Jordan et al., 2003). These results demonstrate that RD-only students also exhibit mathematics difficulties in some areas, but are capable of using their strengths to perform better than students from the MDRD group.

Consistent with these results, Vukovic et al. (2010) demonstrated that both children with dyslexia and children with specific reading comprehension difficulties performed equally well on word problem tasks but significantly poorer than average readers did. However, the children with reading comprehension difficulties did not differ from the average readers in arithmetic fact fluency and operation tasks, whereas the dyslexia group performed at a lower level in both sets of tasks. Vukovic and her colleagues also concluded that children with decoding problems (dyslexia) had a higher risk of mathematical difficulties. Recently there has also been convincing evidence that both general language skills (LeFevre et al., 2010; Vukovic & Lesaux, 2013a), and more specific skills such as phonological processing (Vukovic, 2012; Vukovic & Lesaux, 2013a) uniquely predict growth in mathematical skills. Therefore, it would be logical to conclude that learning difficulties in older students could manifest in difficulties in both reading and mathematics.

Concerning MD, there is evidence that both MD-only and MDRD groups show fundamental deficits in factual knowledge (e.g., arithmetic fact retrieval) and that this is a primary characteristic of MD (Andersson, 2010; Jordan et al., 2003). A recent meta-analysis by Swanson, Jerman, and Zheng (2009) investigated differences in cognitive features in MD-only students, RD-only students, MDRD students and average achievers. All studies included in the meta-analysis reported reading, intelligence scores (IQ), and math scores for children with MD and poor reading ability. The most significant differences in cognitive components were found between the average achievers and those with MD only, namely in working memory (WM) and literacy skills in favour of the average achievers. The MD-only and RD-only groups differed in variation in WM and problem-solving skills; interestingly, the differences concerning these two groups could not be attributed to differences in mathematics and reading skills. An advantage in IQ and long-term memory were the only characteristics that distinguished MD-only students from MDRD students.

These results support the idea that grouping systems that aim to create qualitatively (type) different subtypes in fact only create quantitatively (level) different subtypes of learning difficulties (Vukovic, 2012; Vukovic & Lesaux, 2013a,2013b). However, the terminology surrounding mathematical learning difficulties is in itself problematic, as various terms are used, such as mathematical disability, developmental dyscalculia, mathematical learning difficulties and low achievement in mathematics (see Mazzocco, 2007 for a detailed discussion). Furthermore, there is no consensus on the underlying causes of mathematical learning difficulties, suggesting that multiple causes underlie difficulties in mathematics (Andersson & Östergren, 2012). These various causes produce different subtypes of mathematical learning difficulties (Murphy et al. 2007) with differential relations to reading skills. To date, the literature has been heavily dominated by research on younger children (Andersson, 2010; Jordan et al., 2003; Vukovic & Lesaux, 2013a), and few studies have been conducted with adolescents (Authors, 2012; Kyttälä, 2008).

To summarise, in children (aged 7–13), MD-only and MDRD groups perform worse than RD-only and average-performing children with respect to the technical aspects of mathematics (e.g., factual knowledge). Children with dyslexia, on the other hand, perform worse than children with reading comprehension difficulties and those with average performance in the technical aspects of reading (e.g., word reading) (Andersson, 2010; Jordan et al., 2003; Vukovic et al., 2010). However, the MDRD group seems to perform lower in both reading and mathematics compared to the MD-only and RD-only groups (Jordan et al., 2003; Vukovic, 2012), and the RD-only and MD-only groups perform similarly on word problem tasks.

Therefore, it is tempting to examine both mathematical and reading skills as continuums in which the order of the traditional subtypes of learning difficulties is similar in that the MDRD group is at the lower end and the typical-performing children are at the higher end of the continuum. The MD-only and RD-only groups fall between these two, with the order being defined by the skill currently being assessed.

Surprisingly little is known about those students performing poorly in mathematics and reading at the end of compulsory school, a stage in their life when they are making decisions regarding their educational futures. We focus on the relations between reading and mathematics in adolescent students to understand how these skills are related to important outcomes, including academic well-being and educational dropout.

1.3. Academic well-being

How students perceive themselves as learners in school and how they experience their schooling strongly influence students' well-being (Goetz, Cronjaeger, Frenzel, Ludtke, & Hall, 2010; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2008, 2012). Furthermore, school is a central factor in the lives of adolescents (Eccles & Roeser, 2009). Therefore, it is reasonable to define well-being in relation to the educational context. Furthermore, students' academic well-being is viewed as an important indicator of the educational process (Holopainen, Lappalainen, Junttila, & Savolainen, 2012; Rueger, Malecki, & Demaray, 2010; Tuominen-Soini et al., 2008, 2012; Van Petegem, Aelterman, Rossel, & Creemers, 2007). However, no consensus exists regarding the definition or operationalisation of academic well-being. Positive and negative indicators of well-being—such as self-esteem, school value and stress—are commonly used indicators of adolescent academic well-being (Pollard & Lee, 2003).

In the present study, we take a slightly different viewpoint and focus on academic self-concept, perceived learning difficulties and school burnout as plausible indicators of academic well-being. Academic self-concept and school burnout were chosen because of their well-documented relations to various outcomes, including long-term health and well-being (OECD, 2003), general happiness (Harter, 1990; Salmela-Aro & Tuominen-Soini, 2010), motivation, (Guay, Ratelle, Roy, & Litalien, 2010; Tuominen-Soini et al., 2008, 2012) and depression (Salmela-Aro, Savolainen, & Holopainen, 2009). In the school context, learning is the central aim and activity for students and teachers. If a student feels that he is having trouble in learning, it will affect his academic well-being. Therefore, we argue that perceived learning difficulties are a meaningful indicator of academic well-being.

Academic self-concept, defined as a mental representation of one's competencies in academic domains (Marsh & Craven, 1997), is positively related to achievement (Marsh, Hau, & Kong, 2002; Valentine, DuBois, &