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The relationship between school readiness and school performance in Grade 1 and Grade 4

Abstract

The research reported in this article was conducted from a socio-environmental perspective on learners' school readiness when entering Grade 1, as well as their school performance in Grade 1 and again in Grade 4. The relation between school readiness and performance in Home Language and Numeracy in Grade 1, and performance in the same learning areas in Grade 4 were investigated by means of a longitudinal quantitative study. One school in the Free State province was purposefully selected. The Aptitude Test for School Beginners (ASB) was implemented to capture school readiness, including school maturity and levels of development in physical, cognitive, emotional, social and normative domains. Results confirm that school readiness significantly correlated with academic performance of the respondents in Grade 1 as well as with their school performance in Grade 4.

Keywords: school readiness; school maturity; school performance; foundation phase education

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Introduction

School readiness can be regarded as a contributing factor to school performance (Abott-Shim, Lambert & McCarthy, 2003). If learners' school readiness is intact when they enter Grade 1, their level of readiness may positively influence their school performance in the formal education situation. However, in order to reach a required stage of school readiness, learners' development needs to be stimulated. Development towards school readiness can be enhanced by means of quality early learning experiences that learners receive before they enter Grade 1 (Fontaine, Torre & Grafwallner, 2006; Hojnosky & Missall, 2006; Petriwskyi, Thorpe & Tayler, 2005). As background to planning suitable early learning experiences and stimulation at preschool level, the question often arises as to what the correlation between school readiness and school performance is. Insight into this correlation can guide preschool teachers in focusing on activities that could enhance the developmental needs of the children they engage with.

The research reported in this article focused on a selected group of learners' school readiness when entering Grade 1, as well as these learners' school performance (Literacy and Numeracy) in Grade 1 and again in Grade 4. The following research questions directed the research:

- To what extent did learners' school readiness influence their school performance in Grade 1?
- To what extent did age influence the learners' school readiness in Grade 1?
- Which relations could be identified between school readiness and school performance in Grade 1 and in Grade 4?

School readiness: biology and mind in tandem?

The generally accepted definition of school readiness indicates a level of readiness in totality for a learner to enter the formal education situation. This required level of development includes aspects such as physical, cognitive, emotional, social and normative development (De Witt & Booysen, 2007). School readiness includes school maturity, which refers to a certain level of physical and mental growth. As such, school maturity can be viewed as a biological and neurological process of growth, which includes aspects such as eye-hand coordination and normal brain functioning. However, different learners are characterised by their own unique tempos of growth, which could play a role in the tempo and levels of school maturity. It follows that school maturity cannot be forced or accelerated yet should be awaited taking each child's unique development into account. It is further important to realise that school readiness cannot be reached without school maturity. Yet, if learners' school maturity is intact, they can be stimulated towards school readiness, which can be accelerated.

In terms of school readiness, learners are regarded as ready for formal schooling when they have developed the skills necessary for functioning within the formal

school situation, such as understanding and organising information, and have acquired perceptual and conceptual skills such as visual and auditory discrimination, as well as memory and problem-solving skills (De Witt & Booysen, 2007; Moletsane & Bouwer, 2000). Specific qualifying criteria for successful entry into the formal school include:

- Cognitive skills that relate to language and literacy abilities. Previous literacy experiences and phonological processing play an important role. General knowledge also forms part of cognitive school readiness (Pogorzelski & Wheldall, 2005; Savage & Carless, 2005; Wright, Diener & Kay, 2000).
- Physical skills such as gross, fine and perceptual motor skills (Moletsane & Bouwer, 2000).
- Emotional development, which forms the inner discipline for the child to want to learn. Emotional stability that furthers the learner's independence is of importance (Bagdi & Vacca, 2005; Broadhead, 2004; Folds, 2005; Wright *et al*., 2000).
- Social skills that include situational readiness and insight in social relations and behaviour (Blair, 2002; Raver, Aber & Gershoff, 2007).
- Normative school readiness, which includes self-regulation skills that influences learning behaviour such as persistence, paying attention, the intentionality to want to learn, following instructions and inhibiting inappropriate actions (Fantuzzo, Bulotsky-Shearer, McDermott, McWayne, Frye & Perlman, 2007; McClelland, Cameron, Connor, Farris, Jewkes & Morrison, 2007).

The skills on this list are influenced by demographic factors such as age, gender and socio-economic status. The research discussed in this article was conducted from a social-constructivist perspective, recognising the potential influence of the environment on the development of school readiness (Coolahan, Fantuzzo, Mendez & McDermott, 2000). This view reflects Bronfenbrenner's theory, which emphasises the relation between the community, school and family (Bronfenbrenner, 1979; Donald, Lazarus & Lolwana, 2010; Schulting, Malone & Dodge, 2005).

The relation between school readiness and school performance

As I have already intimated, school readiness implies specific levels of cognitive, physical-motor, affective-social development required by the school beginner. Schools require young children to be ready to learn in a formal school setting, which means that they will have sufficiently developed in body and mind to face the challenges of school education. It also represents the stage when a learner can adapt fairly easily, effectively and without emotional disturbances within a formal teaching programme, which includes interacting with many other young children and a number of adults who are not part of their home community and family (De Witt & Booysen, 2007).

School performance on the other hand refers to the progress learners make in all aspects of their school careers. This construct includes cognitive, physical, emotional,

social and normative adjustment as well as self-regulating skills such as management of distractibility, adaptability, paying attention, following instruction and inhibiting inappropriate actions (Wright *et al.*, 2000). All these skills are critical elements for school performance. Learners who enter school without these academic and self-regulating skills, face a significant greater risk for experiencing difficulties such as poor school performance, anti-social behaviour and peer rejection (McClelland *et al.*, 2007; Yu, Chan, Cheng, Sung & Hau, 2006). Seen like this, being 'ready' for school means that children must be able to live with some stress too. Young children who enter school with high levels of self-regulation tend to perform better in Literacy and Numeracy. Therefore, a distinct link exists between the total development of a learner, the act of self-regulation and school performance (Chang & Burns, 2005; Wright *et al.*, 2000). Learning to self-regulate, however, requires much interaction and modelling in a social context in the home and in the community, prior to school entry. Rogoff (1990) has shown how young children are 'apprenticed' into a way of living and doing. Children who do not have experience of behaviour monitoring and individual care find it hard to self-regulate in a school context.

The family and family social position can also be related to a learner's school performance, as well as cognitive, social and emotional functioning (Hung & Marjoribanks, 2005; NICHD, 2003; Schulting *et al.*, 2005). Specifically, the interaction between parents or other family members and a young child is of vital importance. Parent-child interaction has been found to be a more powerful predictor of a young child's school performance as a learner in the formal system than the family background and socio-economic status (Hung & Marjoribanks, 2005). This view is underplayed in the South African literature, but there are other factors to be kept in mind too.

School readiness and school performance requires much more than mere academic skills (Wright *et al.*, 2000). Emotional and social readiness, resilience, self-confidence and self-regulating skills are all vital ingredients of school performance and much of this is learned at home or in preschool. More and more, however, teachers are made aware of the importance of a supportive emotional context before learners can experience successful learning at school (Price, 2002). Many young children come to school from disruptive home and community contexts and school readiness, when seen holistically, cannot be assumed when children reach a certain (school ready) age.

Seen more broadly, school performance involves long-term improvement of broader life outcomes such as increased adult employment and the avoidance of incarceration (Petriwskyi *et al.*, 2005). Therefore, learners' latent potential needs to be developed in order to assist them in becoming well-adapted and functioning adults. Different kinds of intervention at different times are necessary to help learners develop their latent potential (Perez-Johnson & Maynard, 2007). In this study I tried to capture some indication of what happens in the early years of school.

Research methodology

In the study reported on in this article, panel study longitudinal quantitative research (Neuman, 2006) was conducted in one primary school in the Free State province of South Africa. The Aptitude Test for School Beginners (ASB) was administered with the Grade 1 learners of the school. The learners' dates of birth and their academic records (Home Language and Numeracy) for the Grade 1 July examinations, as well as their Grade 4 November examinations, were placed on record. Due to the limited sample size (learners of one school), the findings cannot be generalised to all children in South Africa.

Participants

One school in the Free State province was purposefully selected for the study (De Vos, Strydom, Fouché & Delport, 2005). Maree (2007: 79) defines purposive sampling as follows:

> *[...] it simply means that participants are selected because of some defining characteristic that makes them the holders of the data needed for the study.*

The learners of the selected school all have the defining characteristic of an average socio-economic background. All the Grade 1 learners have formed part of the research and school readiness testing. The study group began with 137 learners in Grade 1 and ended with 114 learners in Grade 4. Eighty-eight (88) learners were Afrikaans speaking and 49 learners, English speaking. All the learners were tested in their mother tongue.

All of the respondents had attended a pre-primary school (following the curriculum of the Department of Education) the year prior to entering primary school. Despite distinct differences in mother tongue, all learners that participated were functioning on a similar level of development, and shared a similar socio-economic background. In Grade 1, the age of the learners varied between 6 years 4 months and 8 years.

Measurement

The ASB was selected as predicting instrument of school readiness as this instrument tests the school readiness of learners six to eight weeks after they had entered Grade 1. The norms of the test apply to this specific phase of formal schooling (Olivier & Swart, 1974: 2). All raw scores of the various sub-tests are converted to a five-point standard scale, based on standardised norms provided. The standard scale extends from 1 to 5 with an average of 3 and a standard deviation of 1. The ASB was further regarded as suitable for the research reported on based on the statistical reliability (0,74-0,93) and validity (on the 1% level) being intact for the instrument (Olivier & Swart, 1974: 44-46). The test had been standardised for learners who share similar characteristics and backgrounds as the study group selected for this research.

The ASB was applied within the class situation in the seventh week of the respondents' Grade 1 year. The test administrator and three assistants were present throughout and all instructions of the test were strictly adhered to. The following

abilities were measured for all learners who participated: perception, spatial relations, reasoning, numerical abilities, abilities related to Gestalt, coordination, memory and verbal comprehension. In line with the advantages of the ASB as stipulated by Olivier and Swart (1974), the researcher was able to obtain a differentiated picture of certain aptitudes of the group of Grade 1 learners who participated. Subsequently, the instrument implied the potential advantages of using the test results to place Grade 1 learners in homogeneous groups and assisting teachers in planning their teaching methods. In addition the instrument implied the possibility of predicting future scholastic achievement by means of the test scores obtained.

Results and discussion

Data were analysed according to the Pearson correlation and t-test (Manova). The age and performances of the learners in each sub-test of the ASB, as well as their performances in Home Language and Numeracy in Grade 1 and Grade 4, were processed into workable data.

The influence of age on the learners' school readiness

Learners turning seven before or on the 30th of June were regarded as older Grade 1 learners and those turning seven after the 30th of June were regarded as younger Grade 1 learners. Table 1 indicates the differences in school readiness between older and younger Grade 1 learners.

Table 1: Differences in school readiness of six- and seven-year-old learners (N = 137)

Variables	S	F	P
Literacy	101,27	0,76	0,38
Numeracy	27,03	0,17	0,68
Perception (1)	3,04 1	7,50	0,007 **
Spatial (2)	0,58	1,33	0,25
Reasoning (3)	1,56	2,51	0,14
Numerical (4)	0,86	1,60	0,21
Gestalt (5)	0,04	0,09	0,76
Coordination (6)	0,05	0,05	0,84
Memory (7)	9,25	8,17	0,005 **
Verbal comprehension (8)	1,88	2,13	0,15

*≤ 0,05 = significant **P ≤ 0,01 = highly significant

According to the Manova Variance Analyses (Table 1), the school readiness scores of the two age groups differ highly significantly with regard to the sub-tests for perception and memory. Group 1 (older group) thus obtained significantly higher scores

than group 2 (younger group) in the sub-tests related to perception and memory. All other sub-tests did not indicate any difference between the two age groups.

As perception develops in relation to experience and maturity, age can be one reason why the older group scored significantly higher than the younger group on this sub-test. In the same manner, as memory *inter alia* depends on emotional development and the practical exposure of a learner, learners' environments could determine the opportunities they have in life.

As only two of the eight sub-tests indicate a highly significant difference in terms of the two age groups, it can be concluded that age cannot be viewed as more important than specific individual development. Learners cannot be regarded as school ready merely because they have reached a specific age. Therefore, learners' total and holistic development should always be taken into account when considering school readiness.

Correlations between school readiness and school performance

An overview of the correlations between school readiness on the one hand, and school performance in Grade 1 as well as in Grade 4 on the other, is provided in Table 2 (*cf.* page 8).

Correlations between school readiness and performance in Grade 1

Highly significant correlation

All the sub-tests of the ASB indicated a highly significant correlation with the learners' performance in Home Language in Grade 1. In addition, all the sub-tests but sub-test 5 (Gestalt) and sub-test 6 (Coordination), showed a highly significant correlation with the learners' performance in Numeracy in Grade 1.

Significant correlation

Sub-test 6 correlated significantly with learners' numeric school performance. No significant differences were indicated in performance between the Afrikaans and English-speaking learners' performances.

Correlations between school readiness and performance in Grade 4

Highly significant correlation

Sub-test 3 (Reasoning), sub-test 5 (Gestalt) and sub-test 7 (Memory) indicated a highly significant correlation with the learners' performance in Home Language in Grade 4. In addition, sub-test 3 (Reasoning), sub-test 4 (Numeracy), sub-test 5 (Gestalt) and sub-test 7 (Memory) indicated a highly significant correlation with the learners' performance in Numeracy in Grade 4.

Table 2: Correlations between school readiness and school performance (Home Language and Numeracy) in Grade 1 and Grade 4

		School readiness								School performance			
		Sub-test 1 Perception	Sub-test 2 Spatial	Sub-test 3 Reasoning	Sub-test 4 Numerical	Sub-test 5 Gestalt	Sub-test 6 Coordination	Sub-test 7 Memory	Sub-test 8 Verbal Comprehension	Grade 1 Home Language	Grade 1 Numeracy	Grade 4 Home Language	Grade 4 Numeracy
Grade 1 Home Language	Pearson correlation (r)	0.34	0.29	0.20	0.37	0.50	0.26	0.24	0.26		0.586	0.555	0.508
	p-value	0.00 **	0.00 **	0.01 **	0.00 **	0.00 **	0.00 **	0.00 **	0.00 **		0.000 **	0.000 **	0.000 **
Grade 4 Home Language	Pearson correlation (r)	0.189	0.223	0.341	0.238	0.272	0.064	0.270	0.203	0.555	0.549		0.840
	p-value	0.044 *	0.017 *	0.000 **	0.011 *	0.003 **	0.499	0.004 **	0.030 *	0.000 **	0.000 **		0.000 **
Grade 1 Numeracy	Pearson correlation (r)	0.31	0.37	0.19	0.36	0.22	0.15	0.32	0.30	0.586		0.549	0.609
	p-value	0.00 **	0.00 **	0.00 **	0.00 **	0.77	0.07 *	0.00 **	0.00 **	0.000 **		0.000 **	0.000 **
Grade 4 Numeracy	Pearson correlation (r)	0.127	0.287	0.268	0.396	0.254	0.020	0.281	0.228	0.508	0.609	0.840	
	p-value	0.177	0.002 *	0.004 **	0.000 **	0.006 **	0.831	0.002 **	0.015 *	0.000 **	0.000 **	0.000 **	

Grade 1: N = 137 Grade 4: N = 114 * $p \leq 0.05$ = significant **$p \leq 0.01$ = highly significant

Significant correlation

Sub-test 1 (Perception), sub-test 2 (Spatial), sub-test 4 (Numerical), sub-test 5 (Gestalt) and sub-test 8 (Verbal comprehension) showed a significant correlation with the learners' performance in Home Language in Grade 4. Sub-test 2 (Spatial) and sub-test 8 (Verbal comprehension) furthermore showed a significant correlation with the learners' performance in Numeracy in Grade 4.

Correlations between Grade 1 and Grade 4

Table 2 provides a useful comparison of school performance for Home Language and Numeracy in Grade 1 and Grade 4.

Highly significant correlation

A highly significant correlation between Home Language and Numeracy scores in Grade 1 was evident. Similarly, a highly significant correlation between Home Language and Numeracy scores in Grade 4 was indicated.

In terms of a correlation across grades, a highly significant correlation between Home Language scores in Grade 1 and Grade 4 was evident. Finally, a highly significant correlation between Numeracy scores in Grade 1 and Grade 4 was depicted.

Conclusion

In terms of the potential relation between age and school readiness the research reported on in this study did not indicate a significant influence of age on all aspects of school readiness. The only two areas of development that seemingly related to age, among other factors, relate to perception and memory.

With regard to the influence of school readiness on school performance, several conclusions can be drawn, following the findings of the study. Firstly, the learners that performed well on the ASB also performed well in Grade 1. Secondly, a highly significant correlation was indicated between school readiness and performance in Home Language, and also between school readiness and performance in Numeracy in Grade 1. It is a well-known fact that the verbal skills of the Grade 1 learner form the basis for the learner's overall school performance. Next, learners' performance in Home Language and Numeracy seemingly had a significant influence on each other. This finding may be ascribed to the fact that numeracy skills overlap with the skills and building blocks required for mastering Home Language.

Furthermore, Table 2 also shows a significant correlation between school readiness and Home Language; and also between school readiness and Numeracy in Grade 4. A highly significant relation between Grade 1 and Grade 4 is also indicated. The highly significant relation between Grades 1 and 4 indicates that learners who performed well in Grade 1, also performed well in Grade 4. In addition, this correlation indicates that learners who performed well in Home Language, also performed well in Numeracy. Thus, the correlation between these two learning areas seems to be applicable to the

two grades. High performance in Grade 1 was, in fact, repeated in Grade 4. This confirms that previous school performance is a good predictor of future school performance.

The discussed results confirm that school readiness (with its sub-divisions as described in this research) shows a highly significant correlation with academic performance in Grade 1 and Grade 4. Therefore, the conclusion can be drawn that, if learners experience difficulties when undertaking a school readiness test they will most probably display difficulties in terms of school performance. Learners' school performance in Grade 1 will also significantly influence their school performance in Grade 4.

Even though education and related policies are constantly changing in South Africa, school readiness remains to be a prerequisite for school performance. Learners need to be functioning on a certain level of development to be able to perform well in Grade 1. The school readiness test used in this research is regarded as relevant predictor of performance, based on the participating learners' performance on the ASB correlating with their performance in Grade 1. Subsequently, problems indicated during a school readiness assessment can predict a negative impact of limited functioning in important areas of development on a learner's school performance in both Grade 1 and Grade 4.

Even though this research highlight school readiness as prerequisite for sufficient performance in Grade 1, further research is required in schools where learners are learning in a second language as medium of instruction, in order to determine whether or not this finding also applies to such a context. In addition, learners' Grade 1 performance needs to be investigated in different early childhood development settings in an attempt to determine the impact of quality of pre-primary education on subsequent performance in Grade 1.

Based on the indicated correlation between school readiness and school performance, learners that may develop learning problems in the primary school setting can potentially be identified at a very early stage by means of a school readiness test. In light of these findings, it is recommended that all Grade R learners should be screened for school readiness. This process needs to focus on identifying areas for improvement in terms of learners' development that could potentially result in learning difficulties if not addressed in a preventative manner. These areas can for example be developed and/or enhanced by means of stimulation during the second semester of the Grade R year. As such, school readiness screening could be utilised to identify and address under-developed areas.

The findings of this research underline Blair's (2002) argument stating that, although societies are faced with many changes and challenges in the 21st century that lead to adapted education strategies, school readiness will always significantly influence the school performance of young learners. As such, assessment of the school readiness of all learners entering Grade 1 can be one starting point to better South African learners' school performance in their school careers. More importantly, though, much more attention needs to be directed at preschool child care and development, including preparation for school in the reception year (Grade R).

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