

NEIGHBOURHOOD PERSPECTIVE ON SCHOOL READINESS IN KINDERGARTEN, ACADEMIC TESTING IN GRADE 3, AND AFFLUENCE LEVELS

**Magdalena Janus*, Tara Harren°, Eric Duku†
The Offord Centre for Child Studies**

Presented at the McMaster University Psychiatry Research Day, April 22, 2004

INTRODUCTION

Children's readiness for school at kindergarten is presumed to be a very strong indicator of their future success in school and later in life on an individual level. The trajectories of children's progress in school are strongly influenced by the skills with which they enter grade school (Alexander & Entwisle 1988). However, even at a population level, when differences among neighbourhoods are considered, kindergarten indicators appear to be related to later outcomes. It is increasingly recognised that the importance of including neighbourhood factors in analyses of children's success at school is crucial (Rimm-Kaufman & Pianta 2000).

Some indication exists from cross-sectional studies that there is association between children's school readiness in kindergarten and later scores on academic tests: in BC, the correlations between population level school readiness and government-mandated Grade 4 tests was about 0.67 (Hertzman, in Mustard & Picherack, 2002), while in an Ontario urban centre the correlation with Grade 3 results was about 0.3 (Janus 2002). However, it could be argued that this association is simply a result of each grade-level scores being highly dependent on neighbourhood socioeconomic status.

In order to establish whether there is an association between kindergarten school readiness and academic skills testing in later grades, this investigation explores the complex relationships among neighbourhood-level children's school readiness at the end of the kindergarten year, results of academic testing at Grade 3 and sociodemographic characteristics. Three sources of data were used: 1) school readiness in kindergarten; 2) performance on Grade 3 tests; 3) sociodemographic characteristics of neighbourhoods.

METHODS

Sample

Teachers of Senior Kindergarten (SK) students in Toronto District School Board (TDSB) in 185 schools completed the Early Development Instrument (EDI, see below) in the Spring of the 1998/1999. In total, there were 9117 students: 8348 in regular classes and 769 (8.4%) in French Immersion.

In the Spring of the 2001/2002 school year, this cohort of students was in Grade 3, and the EQAO Grade 3 tests (see below) took place in May 2002. Results were

released at the school level. The schools were matched by name with the EDI results. 173 schools were matched; complete sets of data for all three tests and the EDI were available for 169.

French Immersion

It was necessary to separate the French Immersion (FI) program students from students attending regular English (RE) for several reasons. First, the Grade 3 tests in English school boards are conducted in English, and it is at the discretion of a school board whether the FI students would participate. TDSB chose to test FI Grade 3 students in mathematics only. Unlike the results for RE programs, grade 3 FI results were released only as a joint percentage of children scoring at or above Level 3. Secondly, of the 173 schools existing in TDSB in 2001, three ran exclusively FI programs, and 23 ran both RE and FI programs. Therefore, the N of schools available for analyses was 26. The remaining 147 schools had RE programs only. It is clear, therefore, that students attending FI did not necessarily attend a neighbourhood school, and thus the assumption that they lived in the school neighbourhood, necessary for the second part of the analyses in this paper, would have been wrong. Therefore, FI students were not included in the neighbourhood analyses.

MEASURES

Early Development Instrument

Data on school readiness of children enrolled in kindergarten (mean age=5.8 years) were collected with the Early Development Instrument in the Spring of 1999 (EDI; Janus & Offord 2000). The EDI is a teacher-completed instrument measuring school readiness in five domains of development: physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge.

For the analyses in this paper, scores in the lowest 10th percentile (based on the distribution for all TDSB students) for each domain were considered to indicate “vulnerability”, and scores in the highest 10th percentile indicated “excellence”. Percentages of vulnerable and excellent children per domain, and in one or more domains per school were used as predictor variables.

Grade 3 Tests

Tests in three domains; reading, writing and mathematics, mandated by provincial government, were written by the same cohort of children in Grade 3 in May of 2002. Results are available to public as aggregates per school: percentage of children scoring at or above provincial standards (Levels 3-4), and percent of children not meeting provincial standards (Levels 1-2).

Social Index

Sociodemographic characteristics for each neighbourhood were used to create a “Social Index” of disadvantage with range from 0, best to 9, worst; based on being above or below the national mean for nine risk factors. Principal component analysis

revealed that they contributed to three factors: SES (high school education, unemployment, percentage of income from social assistance), Immigration (recent immigration, ability to speak official language, low income), and Instability (being a lone parent, recent mobility, no home ownership).

ANALYSES

Results of children from French Immersion classes were compared with those in Regular English programs. Both in kindergarten, and in mathematics at Grade 3 level, FI students were scoring significantly better than RE students.

School-level analyses

Correlations of percentages of children scoring the “vulnerable” range in kindergarten with percentages of children scoring below provincial standards in Grade 3, and percentage of children scoring in the “excellent” range with children at or above provincial standard in Grade 3 were carried out for children in RE and FI programs separately.

Neighbourhood analyses

Children attending French Immersion programs were excluded from neighbourhood-level analyses. Data from all sources were aggregated to the neighbourhood level. There were in total 162 neighbourhoods, with 1-4 schools per neighbourhood; and 4-241 individual students per neighbourhood. The percentage of vulnerable or excellent children by neighbourhood was calculated based on the actual numbers; the Grade 3 indicators were averages based on percentages reported for schools belonging to the neighbourhood.

Regression analyses were carried out to determine the contribution of EDI and neighbourhood characteristics to Grade 3 results. The EDI was entered first as percentage of children scoring in the lowest 10th percentile in one or more domains, then the three factors contributing to Social Index. Regressions were performed for each of the three academic domains as outcomes. The outcome was the percentage of children scoring below provincial standards (Level 1 & 2) in each of the academic domain.

SUMMARY AND CONCLUSIONS

- There are low, but significant associations between school-level vulnerability in kindergarten and Grade 3 scores below provincial standards. Similarly, there are associations between school-level excellence in kindergarten and percentage of children scoring at or above provincial level in Grade 3. The strongest associations exist for reading with language and cognitive domains. (Table 1)

- Neighbourhood-level analyses demonstrated that the kindergarten EDI vulnerability indicators contribute small yet significant proportion of variation to percentage of Grade 3 low reading and writing scores. (Table 2)
 - The contribution of the EDI vulnerability indicators to mathematics scores was smaller and not statistically significant. (Table 2c)
 - Neighbourhood socioeconomic status variables contributed most strongly to Grade 3 results in all three academic areas. However, Instability factors contributed to writing and math, and Immigration factors to math. (Table 2a-c)

Children's school readiness at kindergarten is an indicator of their future success in school and later in life on an individual level and neighbourhood level. This study shows that gaps in children's abilities due to socioeconomic factors, present at 5 years of age in kindergarten are still there as children grow older.

TABLE 1

School-level Correlations Between Percentages of Vulnerable and Excellent Children in Kindergarten (EDI) and Percentages of Children Scoring Below (Levels 1 & 2) or Above (Levels 3 & 4) on the Grade 3 Assessment

	Percent students scoring in Level 1 and 2 in Grade 3 with percent vulnerable on the EDI				Percent students scoring in Level 3 and 4 in Grade 3 with percent excellent on the EDI			
	Reading	Writing	Math RE	Math FI	Reading	Writing	Math RE	Math FI
Physical Health and Well-Being	.221*	.235*	.191*	-.008	.163*	.162*	.139	-.026
Social Competence	.145	.174*	.058	.042	.163*	.101	.123	.129
Emotional Maturity	.132	.147	.111	.198	-.044	-.049	-.025	.129
Language Cognitive Development	.249*	.190*	.178*	.180	.181*	.150	.138	-.006
General Knowledge & Communication	.261*	.200*	.178*	.153	.293*	.261*	.241*	.198
One or more domain	.271*	.226*	.183*	.225	.164*	.158*	.148	.120
Two or more domains	.264*	.245*	.170*	.131	.210*	.172*	.173*	.165

* p< 0.05, ** p<0.01

TABLE 2

Contribution of the vulnerability (EDI) and Social Index to low Grade 3 outcomes in Reading, Writing and Mathematics

A. Reading

Predictor	Coefficient	R ² adjusted	p-value
% vulnerable in kindergarten	.269 (.097)	0.08	.006
SES	5.427 (1.289)	0.10	.000
	Total Variance Explained	0.18	

B. Writing

Predictor	Coefficient	R ² adjusted	p-value
% vulnerable in kindergarten	.213 (.091)	0.07	.020
Instability	3.430 (1.162)	0.04	.004
SES	3.264 (1.189)	0.04	.007
	Total Variance Explained	0.15	

C. Mathematics

Predictor	Coefficient	R ² adjusted	p-value
% vulnerable in kindergarten	.102 (.114)	0.05	.370
SES	6.053 (1.419)	0.08	.000
Immigration	3.178 (1.435)	0.02	.028
Instability	2.777 (1.384)	0.02	.047
	Total Variance Explained	0.17	

REFERENCES

Alexander KL, Entwisle DR. 1988. Achievement in the first 2 years of school: Patterns and processes. *Monographs of the Society for Research in Child Development*, 53(2).

Janus M. 2002. School readiness, neighbourhood affluence, and Grade 3 test results. Unpublished manuscript.

Janus M, Offord DR. 2000. Reporting on readiness to learn in Canada. *ISUMA Canadian Journal of Policy Research* 2000; 1:71-75.

Mustard, F, Picherack F. 2002. *Early Childhood Development in British Columbia: Enabling Communities*. Canadian Institute for Advanced Research, Toronto.

Rimm-Kaufman SE, Pianta RC. 2000. An ecological perspective on the transition to kindergarten: A theoretical framework to guide empirical research. *Journal of Applied Developmental Psychology* 2000; 21: 491-511.