

Ready for school? Ready for life? School Readiness and School Success: From Research to Policy and Practice

A longitudinal study of the role of school readiness in school adjustment at the start of schooling.

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School success: a determinant of health and an indicator of human and social capital

- School success and educational background are of major importance for individuals and for society.
- Many young Quebeckers and Canadians experience difficulties in school, resulting in too many “drop-outs” before the end of high school.
- More than 42% of Canadian adults and 33% of young adults (Willms, 2004) have not achieved the level (3) of literacy required to obtain a high school diploma.
 - Only 14% have achieved the levels 4 and 5 required for analysis, evaluation and problem-solving (Statistics Canada and OECD, 2005).
- School dropout and low literacy are associated with subsequent difficulties and costs for the individual and for society.
- Certain risk factors are well known, but there is little reliable predictive data.

Need for longitudinal studies starting in preschool.

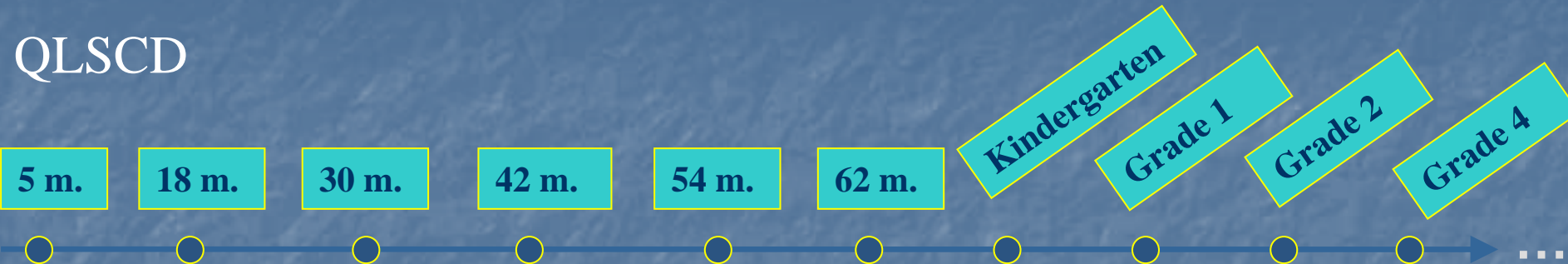
School readiness? School maturity?

- Readiness for school, learning, and education?
 - *School readiness versus readiness to learn*
 - “Child-focused” readiness versus “school-focused” readiness
- Consensus for a global and multidimensional conception of early childhood development

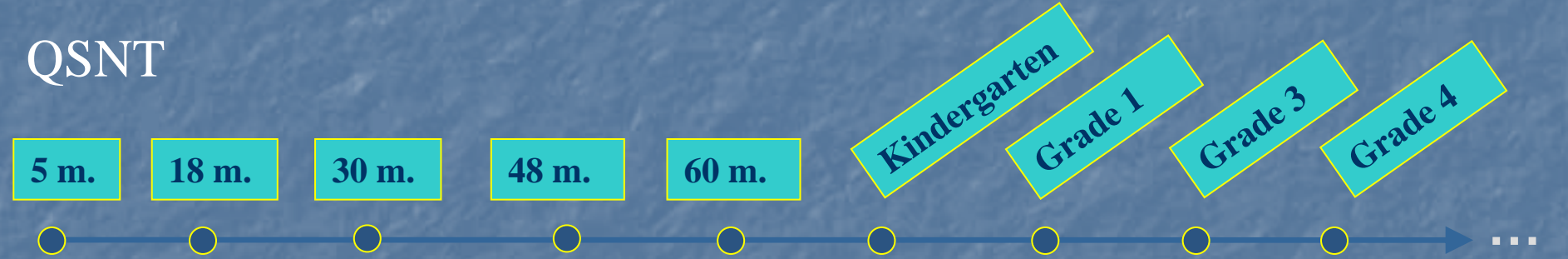
School readiness is related to knowledge and learning prior to school entry, as well as to the cognitive, language, motor, and socioemotional skills needed for school success.

QLSCD and QSNT: twin studies

QLSCD



QSNT



QLSCD: Prospective longitudinal study with a representative sample of over 2000 children born in Québec in 1997-98. Funded by the Government of Québec, FLAC, GRIP and managed by the ISQ.

QSNT: Prospective longitudinal study with a sample 630 families of twins in the greater Montreal area. Funded by GRIP researchers: Michel Boivin, Mara Brendgen, Ginette Dionne, Daniel Pérusse, Philippe Robaey, Richard Tremblay, Frank Vitaro et al. (MSSSQ, ISQ-SQ, CIHR, NHRDP, SSHRC, FRSQ, CQRS, FCAR, CLLRnet)

- Multiple evaluations of the biopsychosocial aspects of development

Evaluation of school performance in Grades 1, 2 and 4

How would you rate this child's current academic achievement in **reading**?

- I do not teach reading to this child..... 1
- **Near the top of the class**..... 2
- **Above the middle of the class, but not at the top**..... 3
- **In the middle of the class**..... 4
- **Below the middle of the class, but above the bottom**..... 5
- **Near the bottom of the class**..... 6

How would you rate this child's current academic achievement in **written work**
(e.g. spelling, grammar)?

...

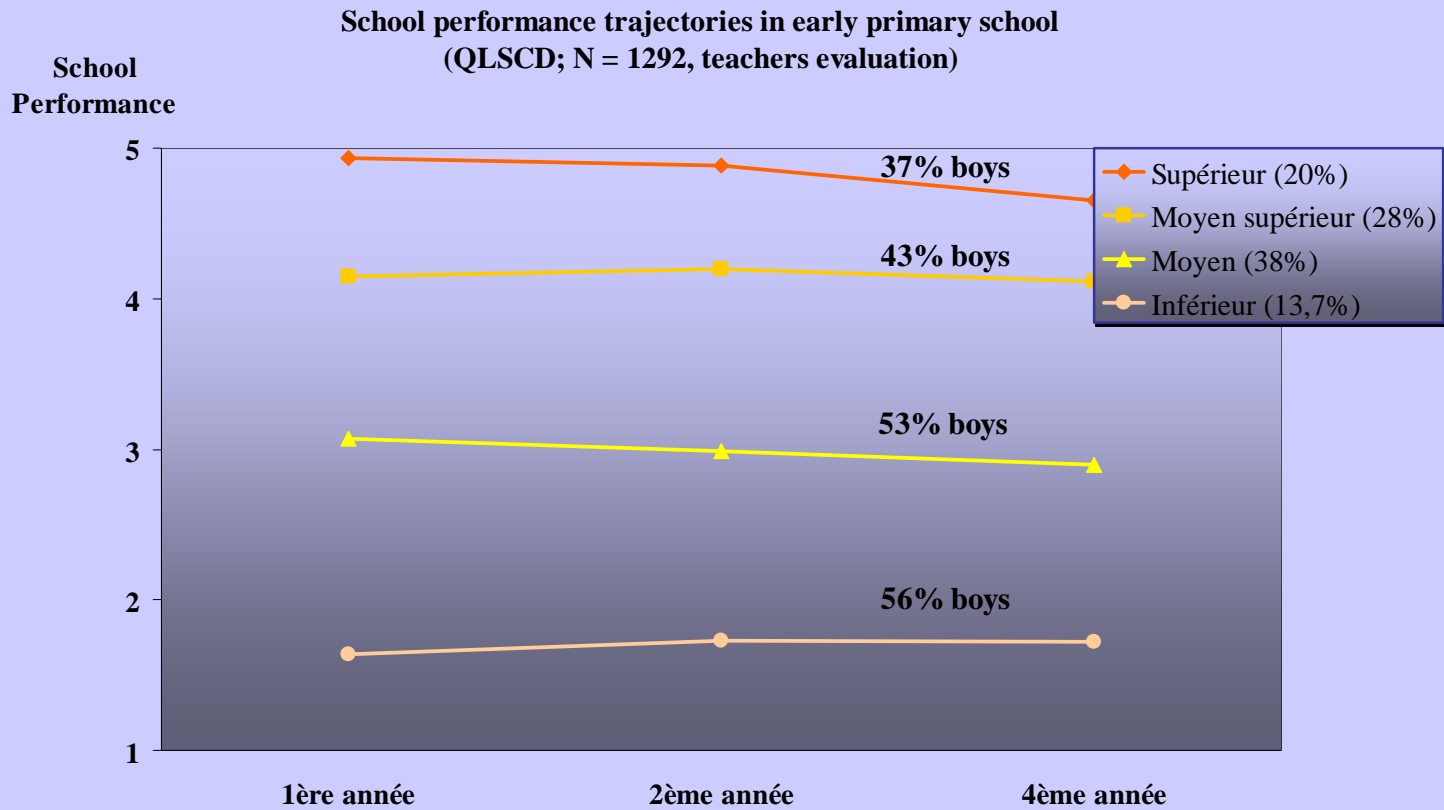
How would you rate this child's current academic achievement in **mathematics**?

...

How would you rate this child's current academic achievement **across all areas of instruction**?

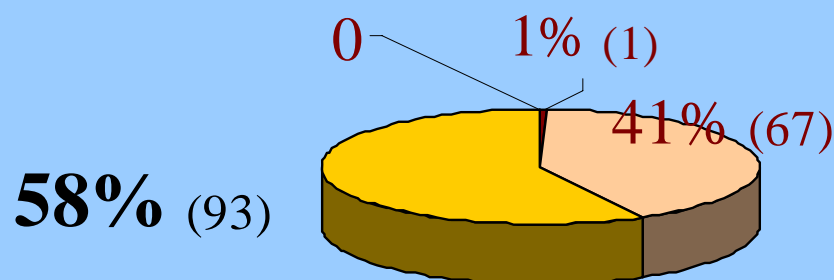
...

School performance trajectories in early primary school



Children who used the services of a speech therapist and/or a remedial teacher in Grade 4 by school performance trajectory

Speech therapist services / remedial teacher
in Grade 4 (n = 161, 17% sample, 55% boys)



■ Rendement scol. supérieur

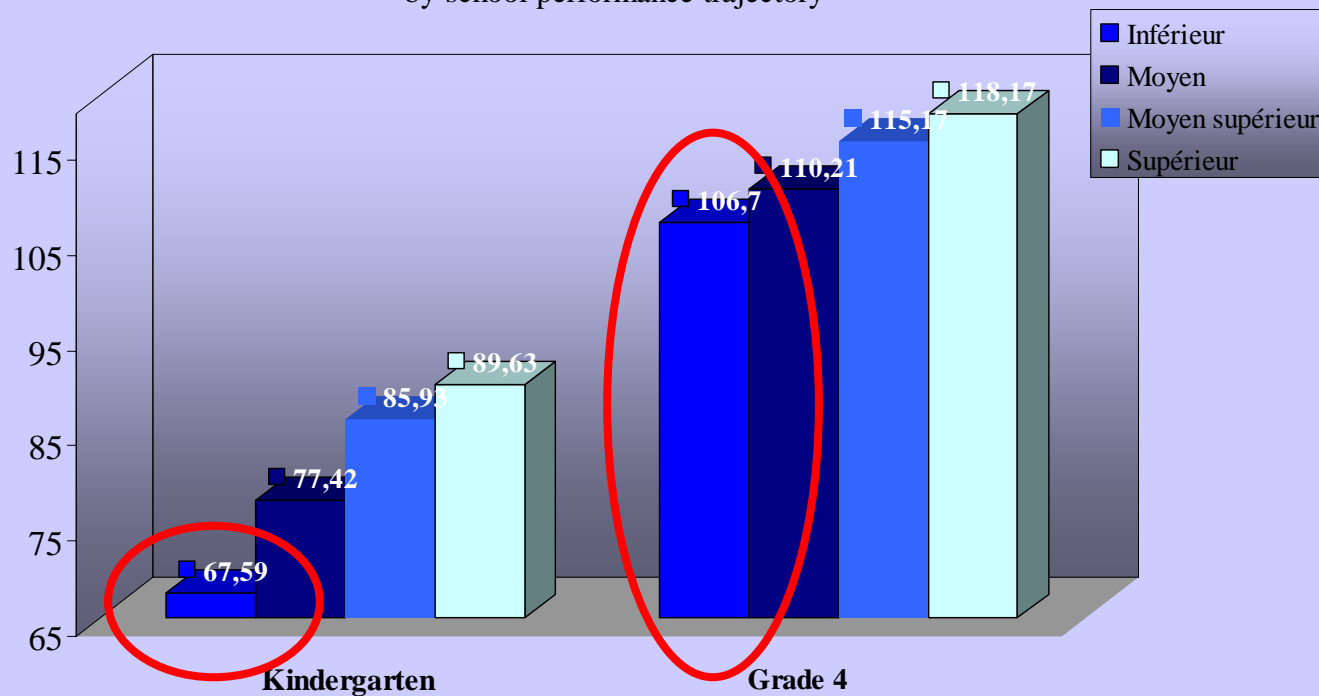
■ Rendement scol. moyen supérieur

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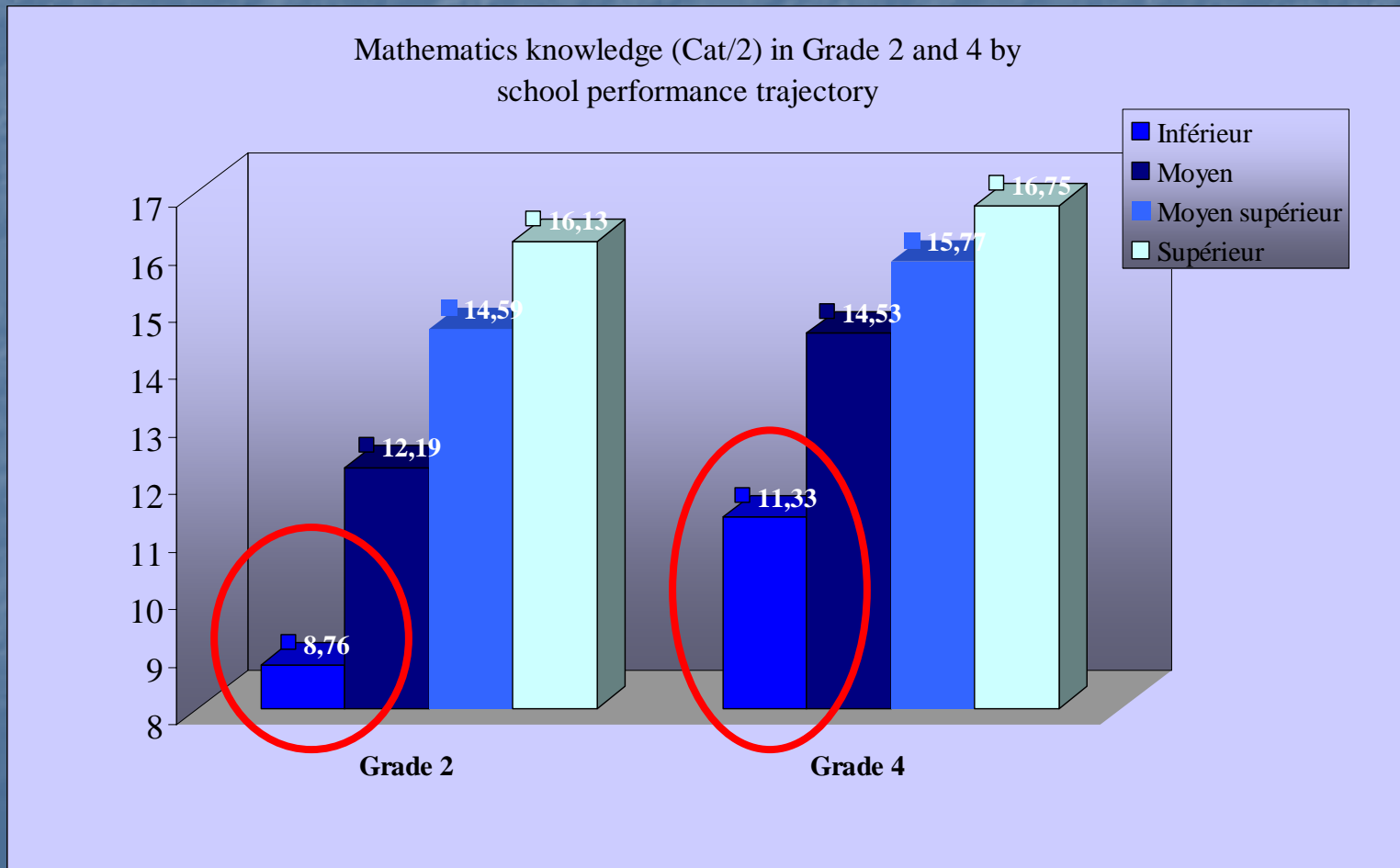
■ Rendement scol. inférieur

Vocabulary level by school performance trajectory

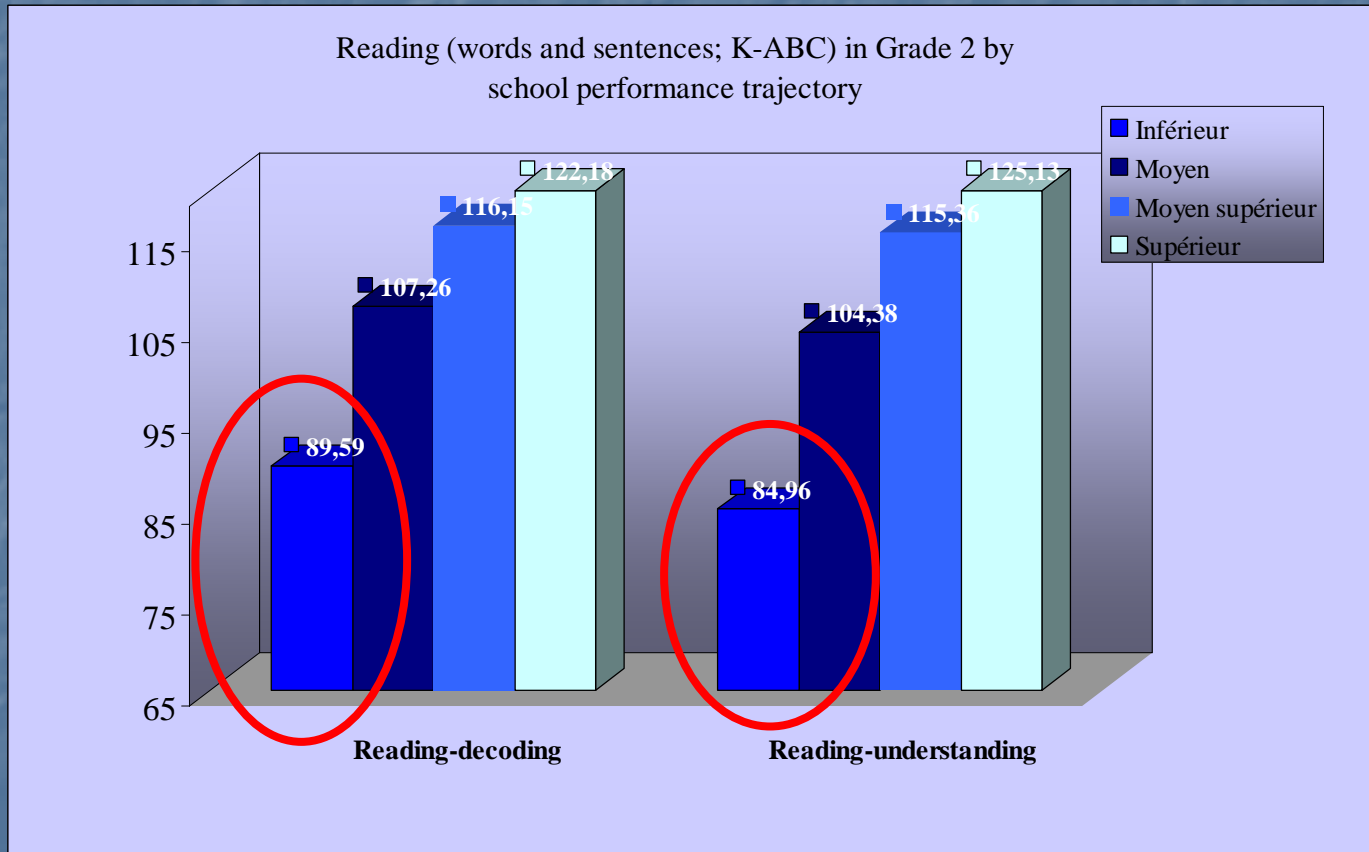
Vocabulary level (PPVT) in kindergarten and in Grade 4
by school performance trajectory



Mathematics knowledge by school performance trajectory



Reading skills by school performance trajectory



Research questions

- Can we predict school performance difficulties from the end of preschool age?
- Can this prediction be based on multidimensional screening tools that are easy to use in a population context?
- How can we obtain a significant prediction from the start of childhood (i.e. before 42 months)?
- What are the early determining factors?
 - Factors specific to the child?
 - Parental and family factors?

Early Development Instrument (EDI; Janus & Offord, 2001)

Physical health and well-being

- Physical readiness for school day (e.g. late for school, rested, tired, hungry).
- Physical independence (e.g. coordination)
- Gross and fine motor skills (e.g. holding a pen)

Social competence

- Overall social competence (e.g. cooperation, peer relationships)
- Responsibility and respect (e.g. self-control, respect for adults and other children)
- Approaches to learning (e.g. listens attentively, works with care)
- Readiness to explore new things (e.g. curiosity)

Emotional maturity

- Prosocial and helping behaviour
- Anxious and fearful behaviour
- Aggressive behaviour
- Hyperactivity and inattention

Language and cognitive development

- Basic literacy
- Interest in literacy/numeracy and memory
- Advanced literacy
- Basic numeracy

Communication skills and general knowledge

- Appropriate use of language, ability to tell a story, understands easily

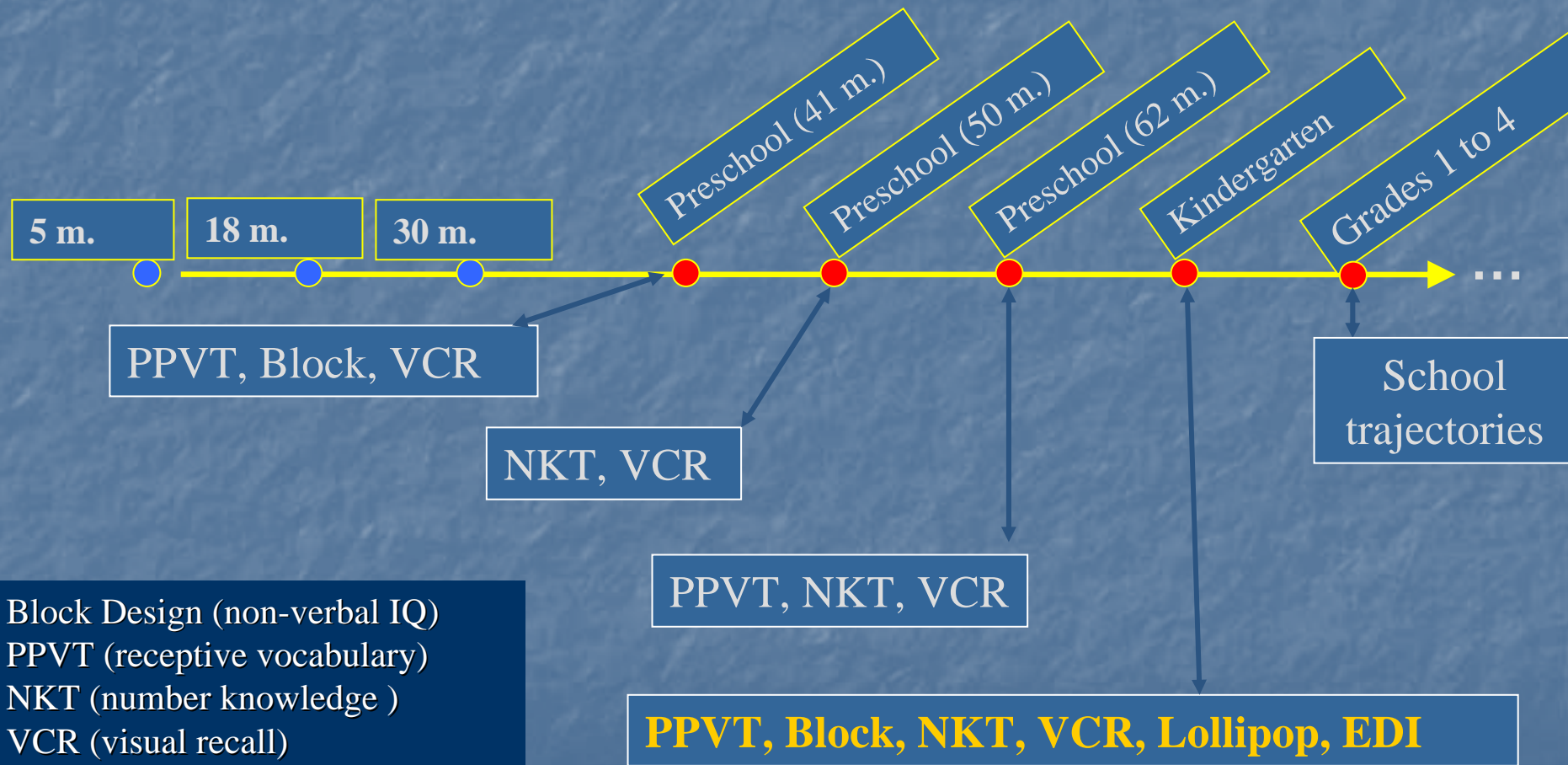
Lollipop Test (Chew 1989)

- Identification of colours and shapes
- Spatial recognition
- Identification of numbers and counting
- Identification of letters and writing

A total school readiness score may be calculated by adding the scores of the 4 sub-tests.

To what extent can we predict school performance problems starting in kindergarten?

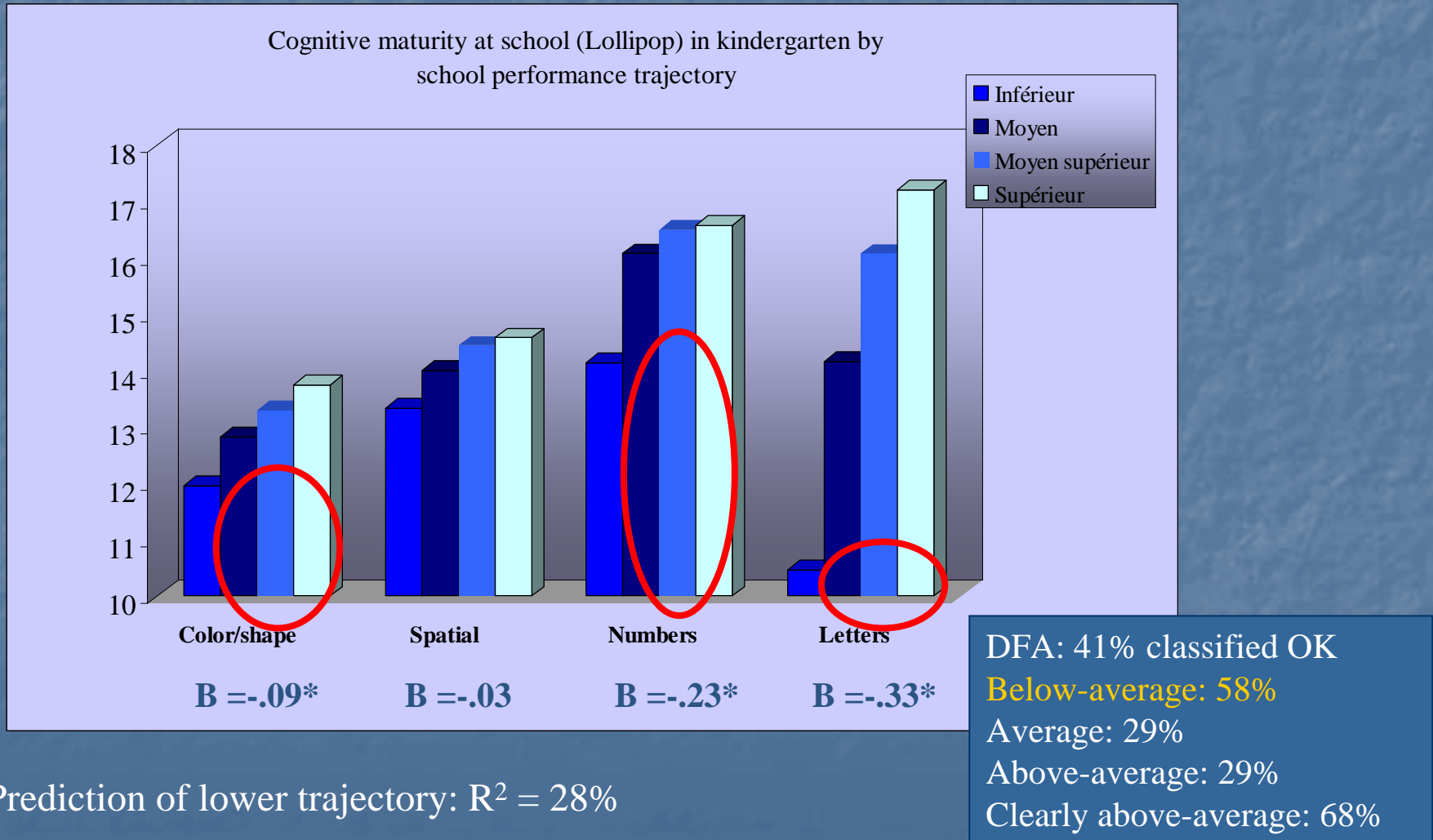
1. The total



Block Design (non-verbal IQ)
PPVT (receptive vocabulary)
NKT (number knowledge)
VCR (visual recall)
Lollipop (4 dimensions)
EDI (Prof: 16 dimensions)

41% of the probability of belonging to a lower trajectory of school performance

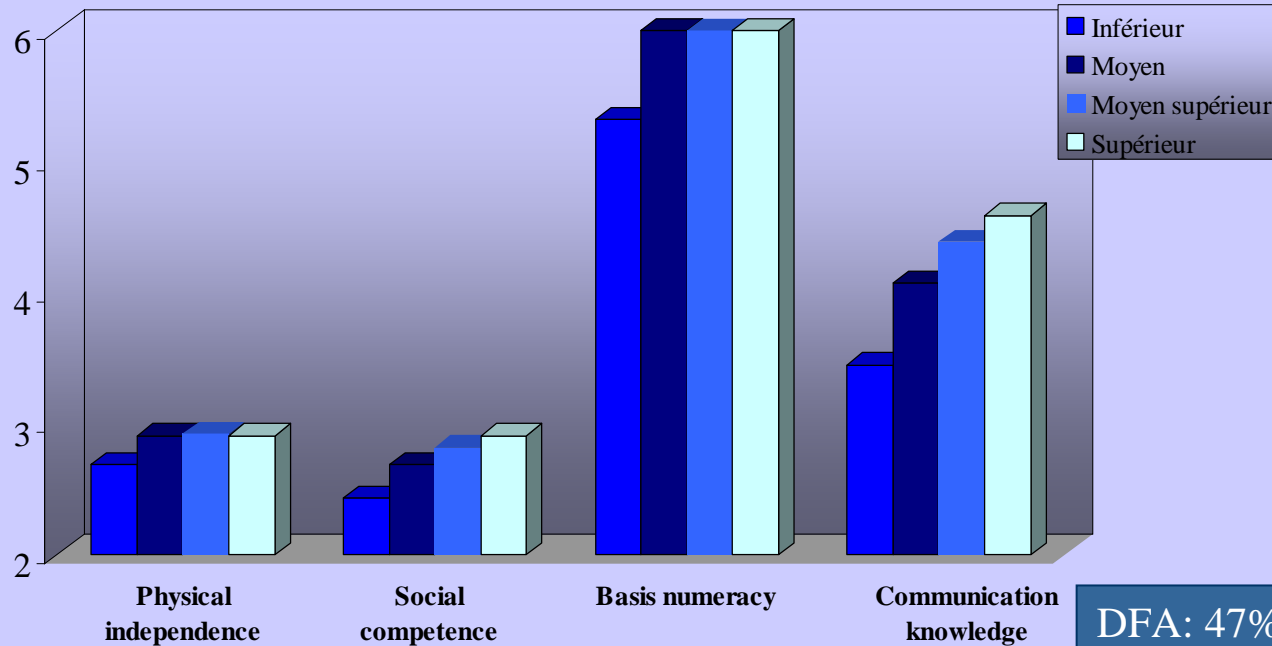
Cognitive maturity (Lollipop) in kindergarten by school performance trajectory



Prediction of lower trajectory: $R^2 = 28\%$

School maturity (EDI) in kindergarten by school performance trajectory

School maturity dimension (EDI) in kindergarten that distinguishes particularly school performance trajectory



Prediction of lower trajectory: $R^2 = 32\%$

DFA: 47% classified OK

Below-average: 62%

Average: 44%

Above-average: 33%

Clearly above-average: 61%

The significant predictors are numerous and varied

- NKT Numbers (-.17***)
- EDI Physical independence (-.09**)
- EDI Social competence (-.16***)
- EDI Basic numeracy (-.15***)
- EDI Communication & general knowledge (-.17***)

- Lollipop Colours & shapes (-.07*)
- Lollipop Numeracy (-.10*)
- Lollipop Letters (-.19***)

...but

Lollipop + EDI

40% of the variance

(versus 41% with the extended battery)

DFA: 51% classified OK

→ **Below-average: 68%**

Average: 47%

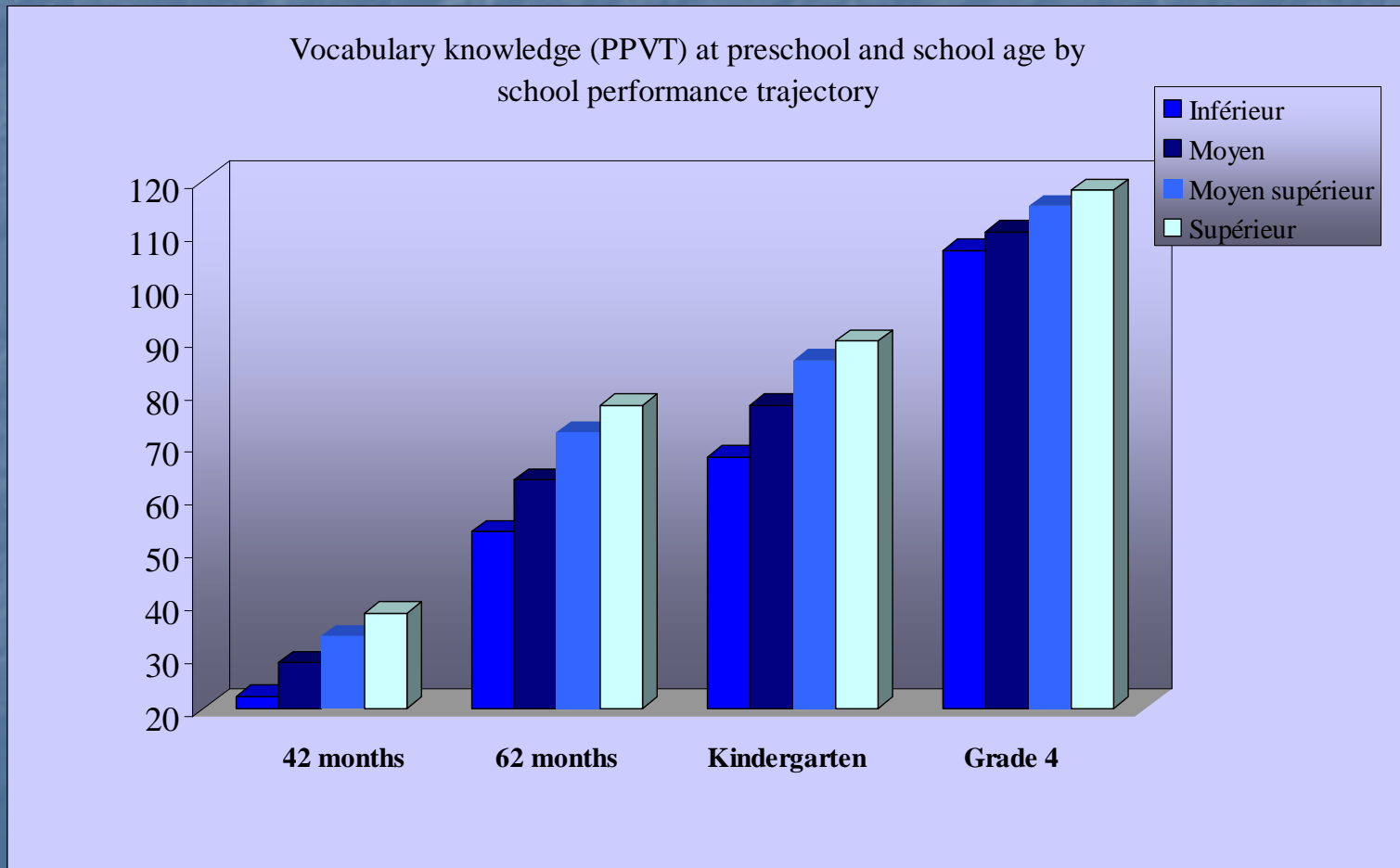
Above-average: 37%

→ Clearly above-average: 66%

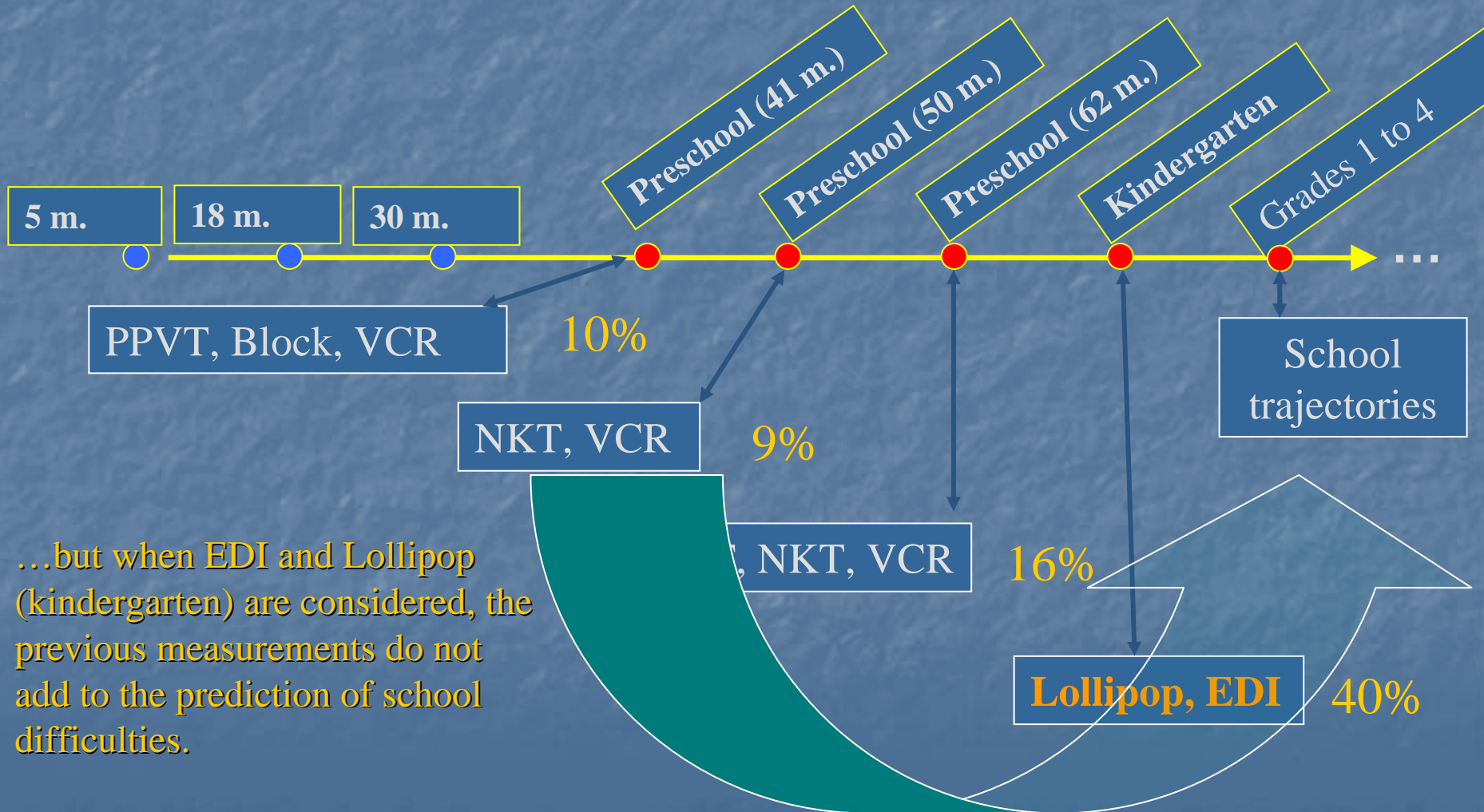
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A difference in vocabulary from 42 months

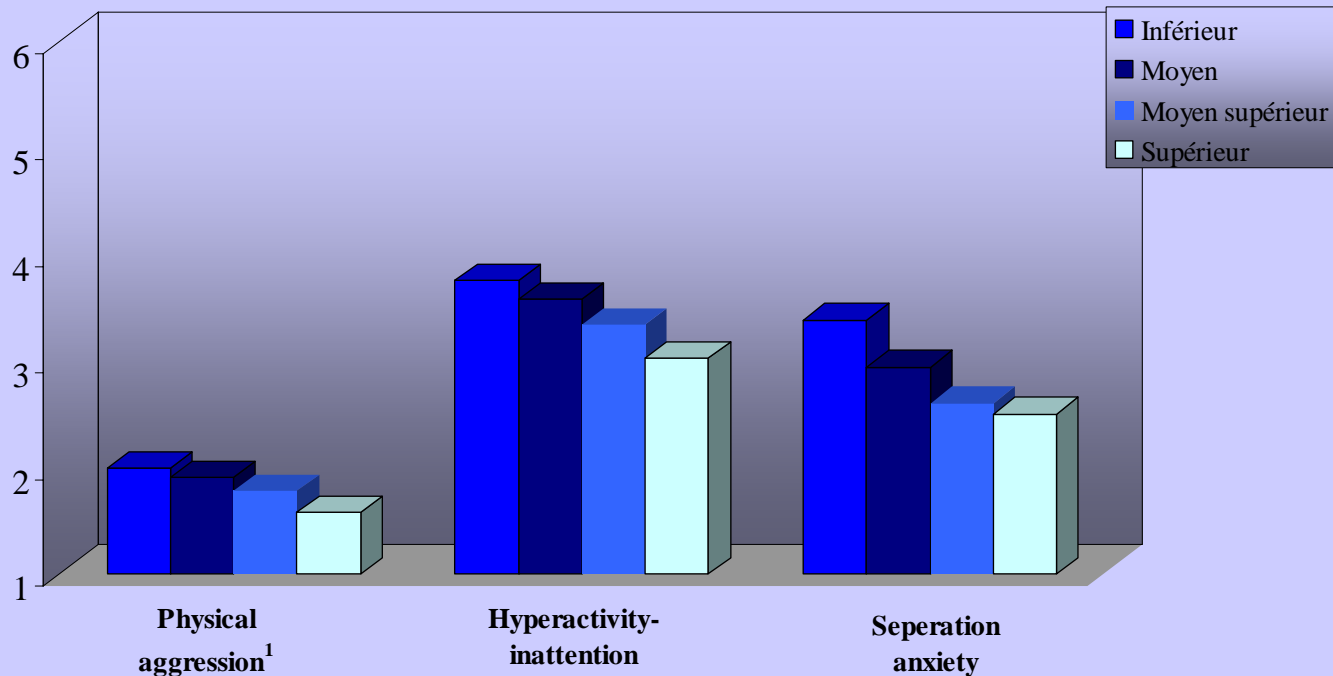


Cognitive maturity measurements at 41-62 months predict school difficulties...



Behaviour problems present from 18-42 months

Behaviour problems before 4 years old distinguishes particularly school performance trajectory



1. Mother's evaluation average at 18, 30 and 42 months

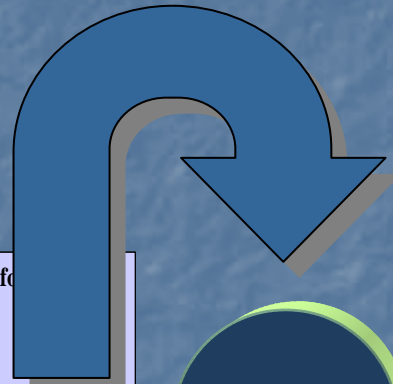
...but when EDI and Lollipop (kindergarten) are considered, these assessments do not add to the prediction of school difficulties.

Research questions

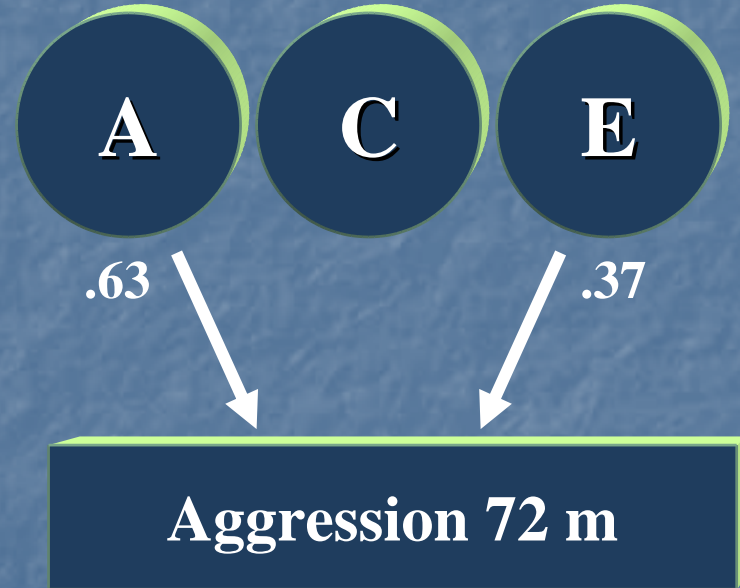
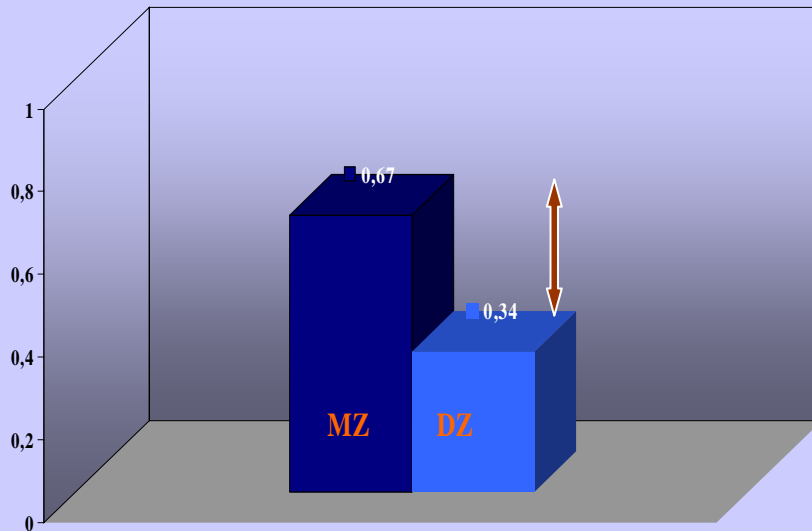
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Advantage of the twin protocol

Evaluating the family aggregation according to genetic pairing



Intraclass correlations for aggressive behaviors in kindergarten (teacher + peer ratings) for MZ and DZ twins (QNTS, different classrooms).
(from van Lier, Boivin, et al. JAACAP, 2007)



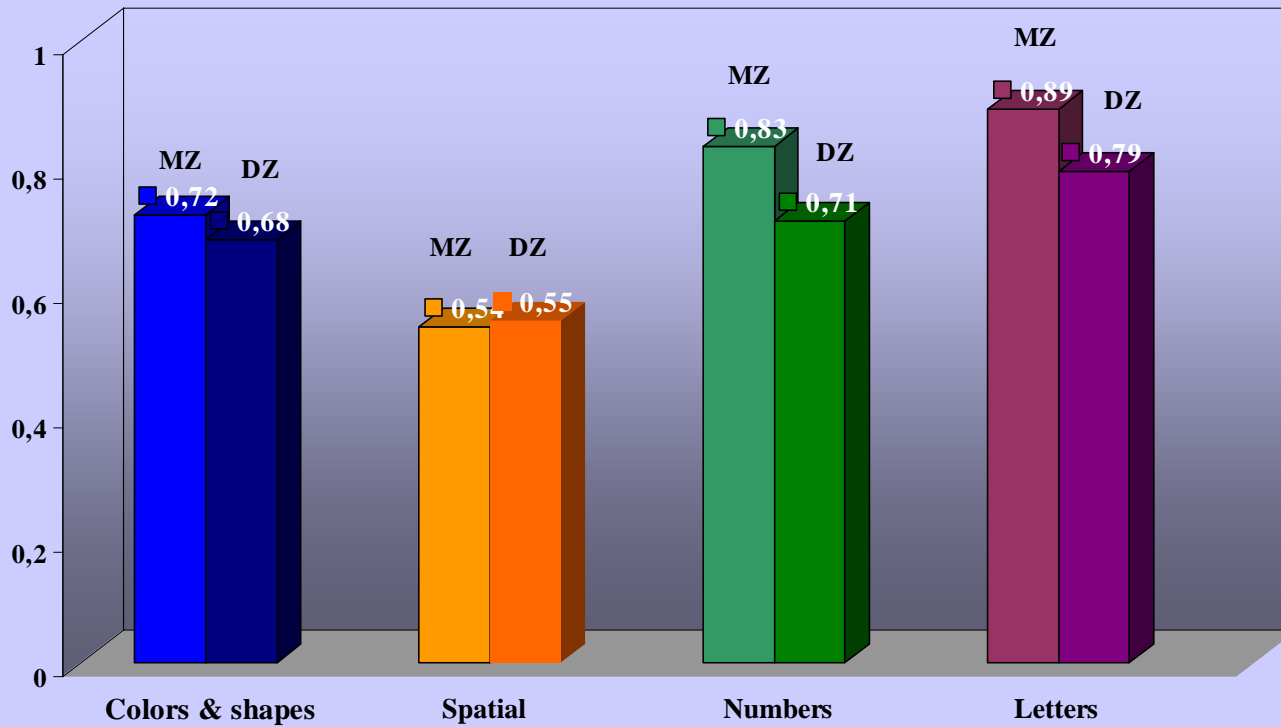
Teacher ratings: (1) Encouraged other children to pick on a particular child; (2) Reacted in an aggressive manner when teased; (3) Tried to dominate the other children; (4) Scared other children to get what he/she wanted; (5) When somebody accidentally hurt him/her, he/she reacted with anger and fighting; (6) When mad at someone, said bad things behind the other's back; (7) Physically attacked people.

Peer nominations (2/item): (1) Fight with other children; (2) Hit and push other children; (3) Tell their friends not to play with other children; (4) Say mean things to other children; (5) Tell their friends mean secrets and nasty things about another child; (6) Get angry because they cannot get what they want.

Teachers-Peers: $r = 0.49$

Determinants of cognitive readiness: The G-E etiology of the Lollipop's 4 sub-tests

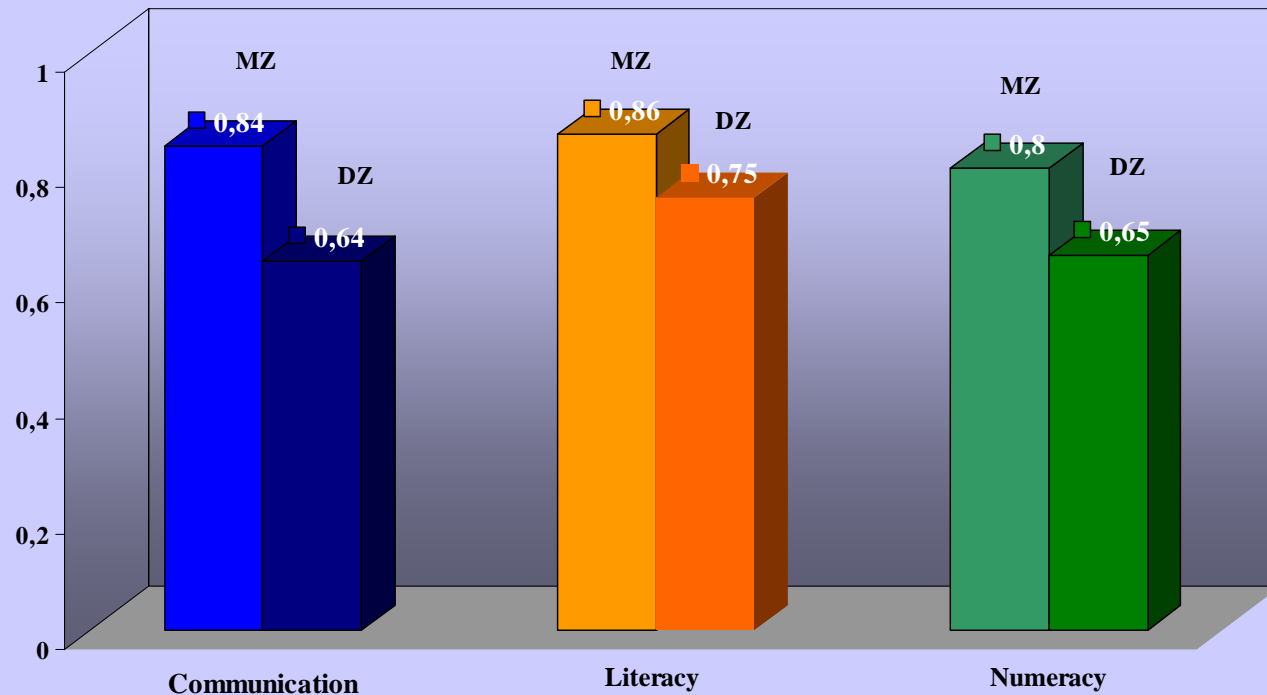
Intraclass correlation between co-twin's pre-kindergarten school readiness scores as a function of zygosity



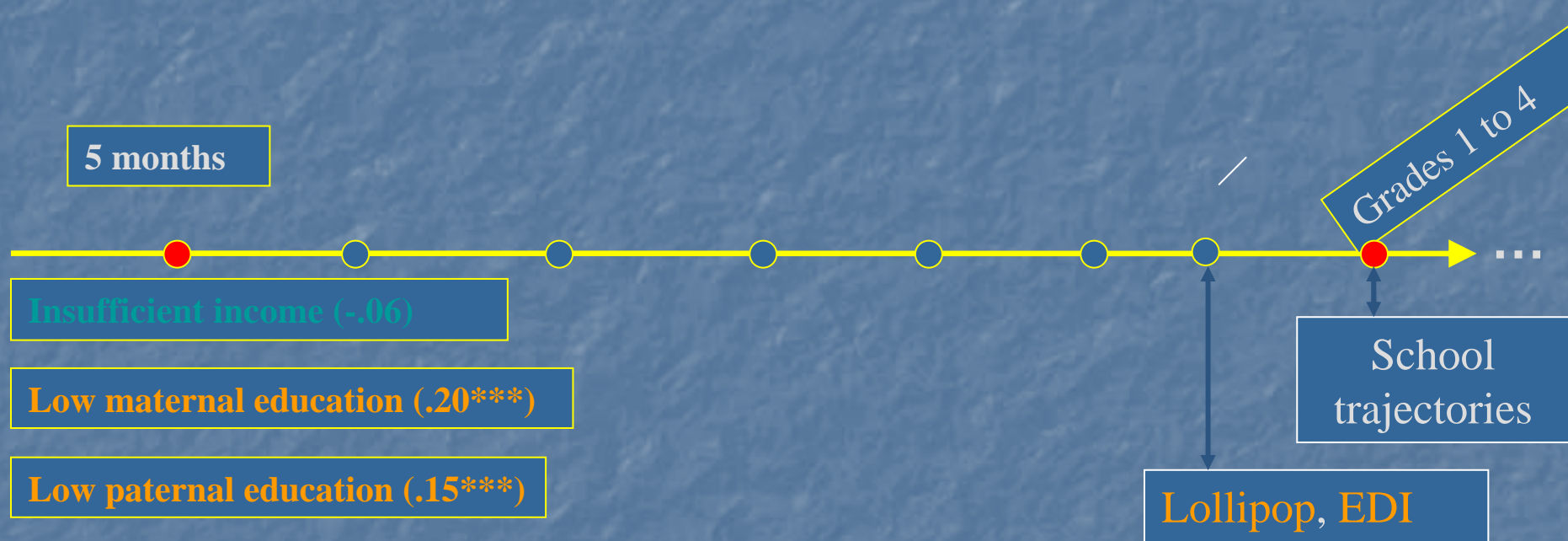
Note: Lollipop Test; Lemelin et al, submitted

Determinants of school readiness: The G-E etiology of the 3 sub-scales of the EDI

Intraclass correlation between co-twin's pre-kindergarten EDI scores
as a function of zygosity

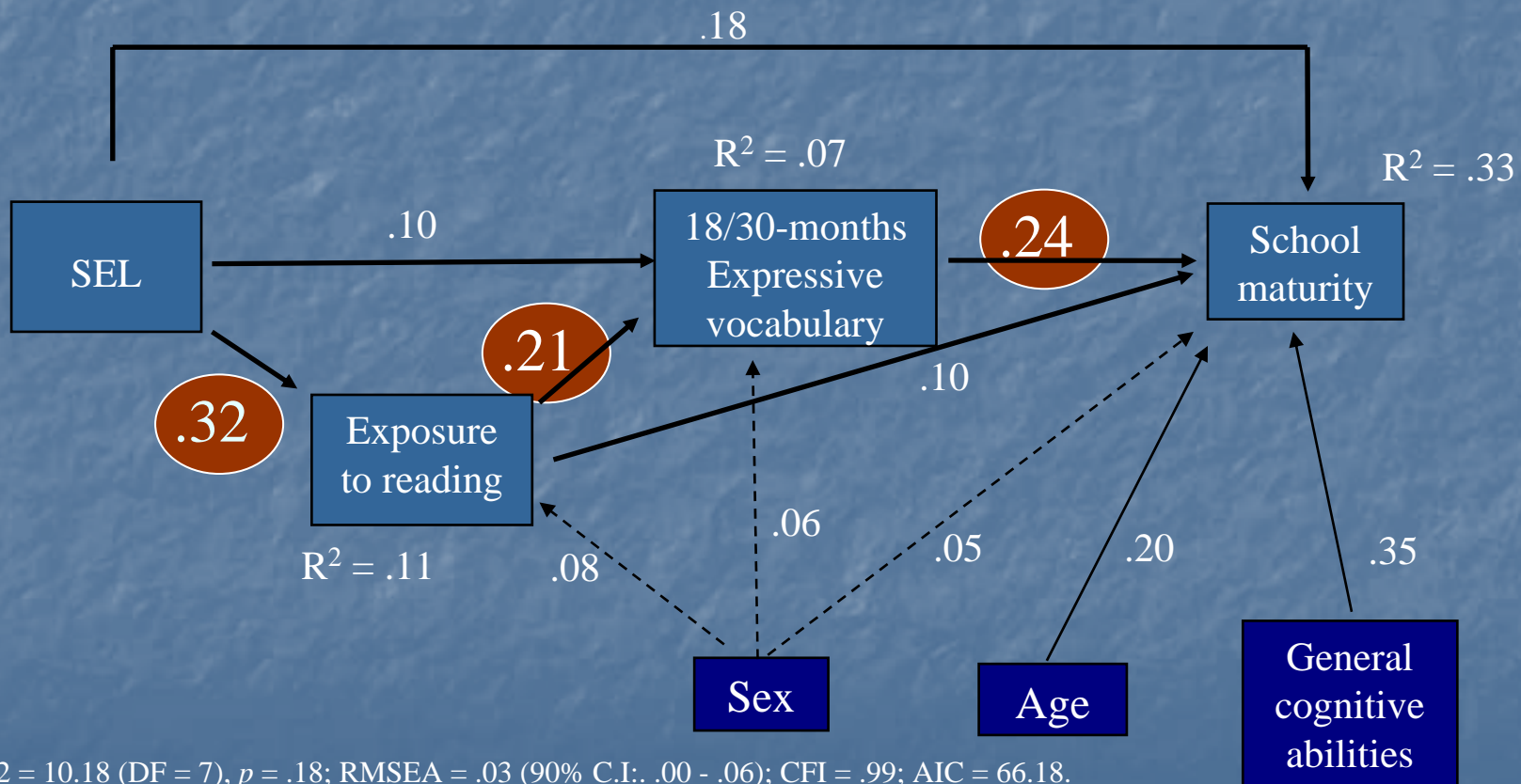


Disadvantaged characteristics at 5 months associated with school difficulties



Family characteristics at birth explain 9% of the variance in school difficulties. Lollipop and EDI explain 71% of this association (2.6% residual).

Exposure to reading, language development and school maturity



Note. $c2 = 10.18$ (DF = 7), $p = .18$; RMSEA = .03 (90% C.I.: .00 - .06); CFI = .99; AIC = 66.18.

Non-significant ($p > .05$) paths are indicated by a dotted line. Relevant correlations between exogenous variables are omitted for simplicity.

Adapted from Forget-Dubois et al., Child Development, 2009

Conclusions

- The Lollipop Test and the EDI are useful tools for predicting school difficulties at the beginning of primary school
 - These tools could be used in a population context to identify groups at risk
- Not all dimensions of the EDI and the Lollipop Test seem pertinent; it is worth using both measurements, because they complement each other.
 - An optimal and shorter version could be developed by combining the two instruments (short EDI +)
- The cognitive, behavioural and social dimensions are important, but they do not all have the same etiology
 - Parental practices that foster cognitive school maturity should be investigated
- EDI and Lollipop were designed for the end of the preschool period.
 - When will we see an EDI-Lollipop for very young children (a VEDI)?