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ABSTRACT

The claim that the incidence of school failure can be greatly reduced by increasing kindergarten entrance age from 57 to 60 months was investigated in three related studies. In the first study, subjects ranging in school entrance age from 57 to 68 months were drawn from five elementary schools in an urban lower socioeconomic area. A total of 114 nonrepeating kindergarten children were administered (1) cost-effective, highly reliable screening tests at the beginning of the kindergarten year and (2) several measures of academic performance at the end of the kindergarten and first-grade years. While first-grade testing involved subsamples, end-of-year promotion decisions were obtained for all children in the sample. The second study, a replication of the first, was similarly designed but included additional children from one middle class school. Some measures of school readiness were retained, some were excluded, and other measures were used. In the third study, interviews to determine the effect of background factors influencing school achievement were conducted with parents of 40 children in the replication study who were between 57 and 59 months old at kindergarten entry. Results of all three studies suggested that raising entrance age is likely to be less productive than initiating a psychometrically based screening program supplemented by intervention geared to the needs of the failure-prone child. (RH)

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Will Raising the School Entrance Age Reduce the Risk of School Failure?

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Abstract

This investigation was undertaken to examine the claim that the incidence of school failure can be greatly reduced by increasing the kindergarten entrance age from 57 to 60 months. The outcome shows that such an approach is far less likely to be successful than using information from the newly developed, highly cost effective, psychometric screening devices that are now available for determining children's readiness for school entry. Evidence is also presented suggesting that if the kindergarten entrance age is increased to 60 months, this increase could force the few failure-prone children who are under 60 months old in September to remain for one additional year in a home environment which, by itself, might further reduce their chances of experiencing later school success.

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## Will Raising the School Entrance Age Reduce the Risk of School Failure?

It is standard practice throughout most of North America to admit children to school based on the child's chronological age in September. Generally speaking, children who are 57 months of age and older in September are eligible for kindergarten entry while those who are younger than 57 months must wait until the following year before enrolling in school. This long standing school admission policy stems from a belief that school readiness is determined largely by the child's overall level of maturity which, in turn, is said to be reflected to a considerable extent in the child's chronological age at the time of school enrollment (Gredler, 1980).

Indeed, a sizable body of evidence has shown that chronological age does correlate to some extent with academic performance, and that even within the normal kindergarten entrance age range of 57 to 68 months, the younger fall-born children (those who are between 57 and 59 months old in September of kindergarten) are somewhat more likely to experience later academic difficulty than children who are between 60 and 68 months old when starting school (Elkind, 1981; DiPasquale, Moule, & Flewelling, 1980; Dickinson & Larson, 1963). Because of findings such as these, school boards have been urged repeatedly to raise the school admission age from 57 to 60 months in order to help reduce the rate of later school failure (e.g. Biemiller, 1982; Carroll, 1963; Donofrio, 1977; Elkind 1981, 1982; Johnson & Johnson 1982). The outcome of the present investigation, however, questions the merit of adopting this proposed policy change. Instead, the findings to be reported show that far greater accuracy in identifying the failure-prone kindergarten child can be achieved through use of the newly developed, highly cost effective testing

procedures that are now available for the purpose of screening children for school readiness.

### Subjects

The sample consisted of 114<sup>1</sup> nonrepeating kindergarten children (62 males, 52 females) from five elementary schools in a lower socioeconomic area of a medium size urban center. The chronological age (CA) of each child at the time of kindergarten admission in September was obtained from information on file in the children's school records. While the kindergarten entrance ages for the sample as a whole ranged from 57 to 68 months, the mean entrance age in September was 62.7 months for the males and 63.2 months for the females.

### Method

Shortly after the start of kindergarten each child, tested individually, was given the Printing Performance School Readiness Test (PPSRT) along with a recently modified version of the Draw-A-Man Test (DAMT) as part of an ongoing program of research dealing with the early identification of children who are at-risk for school failure (Simner, 1982a; 1982b; in press (a); in press (b); in press (c)). It is important to note that since both of these tests can be administered and scored in less than 10 minutes by non-professional staff, an entire kindergarten class can be screened in one to two days by one person. In addition, recent findings show that both tests have an overall classification "hit rate" of approximately 80% (Simner, 1982b; in press (a)). This means that these two tests are extremely cost effective when compared with the more traditional and time consuming devices that are often used for screening purposes such as the de Hirsch Predictive Index of Reading Failure, the McCarthy

Scales of Children's Abilities, the Metropolitan Readiness Tests, or the Wechsler Preschool and Primary Scale of Intelligence.

As measures of subsequent academic performance, at the end of kindergarten the children received a modified version of the Criterion-Referenced Measurement Program in Reading and Mathematics (CRMPRM) by Alkin (1976). This was followed by the letter identification and word identification subtests from the Woodcock Reading Mastery Tests (WRMT) by Woodcock (1974) and the addition, subtraction, numerical reasoning, and word problem subtests from the Key Math Diagnostic Arithmetic Test (KDAT) by Connolly, Nachtman, & Pritchett (1971), administered to 87 and 84 children, respectively, near the end of first grade. In addition to these three criterion measures of academic performance we also obtained information on the end-of-year promotion decisions for all 114 children in this sample. Hence, the children referred to below as "failure-prone" are those who, at the end of kindergarten or first grade, either failed, or if promoted, were placed in a junior or slower section of the next grade ( $N = 21$ ). The top-performing children, on the other hand, were those placed in senior or advanced sections of the next grade at the end of the school year ( $N = 38$ ).

### Results and Discussion

Table 1 shows the product-moment correlations obtained between the children's CA, PPSRT and DAMT performance, respectively, and the three criterion measures of academic achievement. As the results in this table reveal, in each instance, the correlations between the children's performance on both the PPSRT and the DAMT, for males and females alike, exceeded the correlations obtained between the children's CA and these same three criterion measures.

Of central importance to the issue of raising the kindergarten entrance age requirement, though, is the relative effectiveness of this proposed 60 month school admission age cutoff point in identifying failure-prone children when compared with the cutoff points on either the PPSRT or the DAMT. The evidence in Table 2 shows the total number of failure-prone children along with the total number of top-performing children who either were correctly or incorrectly identified as being at-risk for failure using these three different school readiness cutoff points. In brief, these results indicate that of the 21 failure-prone children in the present sample, only six (29%) were under 60 months of age at the time they were admitted to kindergarten. On the other hand, 17 (81%) of these same 21 children obtained scores on the PPSRT that did not meet the PPSRT school readiness cutoff point while 14 (67%) did not meet the DAMT cutoff point. Hence, the number of truly at-risk children that were correctly identified using this proposed increase in chronological age, was far less than the number correctly identified when the cutoff points on both of these school readiness tests were employed.

Parenthetically, the results in Table 2 also show that seven of the children in this sample who were under 60 months old at the time of kindergarten entry, were performing at the top of the class at the end of the school year and so were promoted to senior or advanced sections of the next grade. This means that the number of true positives (the six at-risk children mentioned above) and the number of false positives (these seven top-performing children) identified through use of this proposed 60 month cutoff point was nearly equal. In contrast to these findings, as also reported in Table 2, the number of true positives greatly exceeded the number of false positives for both the PPSRT and the DAMT which, of course, is essential if erroneous decisions regarding school readiness are to be avoided.

In addition, we have further reason for questioning the value of raising the school entrance age from 57 to 60 months. As an outgrowth of a recent investigation (Simner, 1982a) dealing with the PPSRT we interviewed the parents of the 24 children in this sample who were between 57 and 59 months old at the time of kindergarten entry, along with the parents of 20 other fall-born kindergarten children. These interviews were designed to obtain information on a few selected background variables that are known to correlate with later school performance. The outcome of this further work showed that the performance of these 44 fall-born children on the CRMPRM correlated with (1) their mother's level of education ( $r_{xy} = .50, p = .001$ ), (2) the number of children's books at home ( $r_{xy} = .45, p = .001$ ), and (3) the number of moves (changes in address) since the children were born ( $r_{xy} = -.32, p = .02$ ). Specifically, these further results mean that if these fall-born children, as a group, are forced to remain at home for one additional year as a result of raising the school entrance age to 60 months, those few children in this group who, later, do perform poorly in school might be remaining in a potentially less stimulating and somewhat less stable home environment. Since there is now considerable evidence linking a home environment of this type to subsequent poor academic performance (Cook, 1980; Marjoribanks, 1972), denying these children access to school for one additional year might further diminish their chances of later academic success.

Prior to suggesting, however, that this proposal to raise the school entrance age from 57 to 60 months be discarded and that we implement, instead, an alternative policy that would involve psychometric testing as a means of screening all entering kindergarten children for school readiness regardless of the child's age, we need to be certain that the present findings are reliable. To this end, one year later an additional sample of 132 non-repeating

kindergarten children (66 males, 66 females) was obtained from the five original schools along with one other school located in a middle socioeconomic area of the same urban center. As before, each child's CA in September of kindergarten was recorded from information on file in the child's school. Also as before, each child was given both the PPSRT and the DAMT in the early fall of kindergarten. In place of the previous criterion measures, though, we now used a composite score derived from the alphabet knowledge, number knowledge, and the relational concept subtests contained in Lesiak's (1978) Developmental Tasks for Kindergarten Readiness (DTKR), which was administered in the fall along with the PPSRT and the DAMT. This group of subtests was selected from the DTKR because of Lesiak's data showing that children's scores on these particular tests correlate in the neighborhood of .50 to .60 with children's later performance in grade 1. In addition to this new criterion measure, the Wide Range Achievement Test (WRAT) by Jastak and Jastak (1976, Level-1) also was given to 113 of the children in this sample in January/February of kindergarten as a further criterion of school readiness since performance on this test also correlates highly with later school achievement (Stevenson, Parker, Wilkinson, Hegion & Fish, 1976).

Table 3 shows the correlations between the three predictors of school readiness (CA, PPSRT, DAMT) and the children's performance on these two new criterion measures (DTKR, WRAT) for males and females, respectively. As inspection of the findings in this table indicates, the results in the case of both criterion measures closely parallel the results reported in Table 1. Also, according to the information in the DTKR Manual, 12 of the children in this new sample obtained scores that placed them in a failure-prone category while 19 other children achieved scores placing them in a top-performing category. Table 4 presents the classification hit rate data for these two cate-



gories of children in connection with each of the three predictor variables. Comparable data based on the outcome of the WRAT can be found in Table 5. Once again, comparing the evidence in Tables 4 and 5 with the evidence in Table 2, clearly shows the marked similarity between these new data and our original findings.

Finally, we also interviewed the parents of the 40 children in this replication sample who were between 57 and 59 months old at the time of kindergarten entry. These interviews were conducted to determine if the same background factors that we had previously found were linked to the fall-born child's academic performance, were also associated with the criteria for school readiness used with this new sample of children. Table 6 reports the correlations obtained between each of the three background factors and the performance of these new children on both the DTKR and on the WRAT. Here too the results closely parallel those reported above indicating, once more, that the fall-born child's readiness for school entry is indeed tied to certain background factors which, by themselves, could influence later school achievement. In fact, to emphasize this point regarding the different backgrounds that characterize the failure-prone and top-performing fall-born children, data from interviews with the parents of the 25 children in these two extreme groups from the original and replication study combined (the true-positive and false-positive children shown in Table 2 and Table 5 under the heading "Predictor-CA") are reported in Table 7. As these data indicate, the failure-prone fall-born children had access to about half as many books at home, changed addressed (moved) nearly two-three times more often by five years of age, and had mothers with approximately two-three years less schooling than the top-performing fall-born children.

### Conclusion

The results from this investigation suggest that if the current policy for school admission is to be changed with the ultimate goal of reducing the rate of school failure, instead of raising the age of kindergarten entrance to 60 months as proposed, a more appropriate strategy would be to screen all incoming children for school readiness regardless of the child's age (for examples of other highly cost effective screening procedures see Goodman & Hammill, 1975; Kunzelmann & Koenig, 1980; Satz & Fletcher, 1982; Simner, in press(b)). Moreover, if children are screened for school readiness, given the optimistic outlook associated with early intervention today (Lazar & Darlington, 1982) those children whose test scores place them in a failure-prone category could then be assigned to one of the various remedial programs that have now proven so successful in reducing the rate of school failure in many high-risk populations. Generally speaking, these programs usually involve working with children in very small groups or individually, the careful sequencing of tasks that stress academic content, and the use of reinforcement both to maintain the child's attention and to instill certain skills that children from these high-risk populations often lack (Becker & Englemann, 1978; Becker & Gersten, 1982; Miller & Dyer, 1975).

In summary, then, on the one hand the present findings show that the net effect of raising the kindergarten entrance age from 57 to 60 months would be twofold. First, it would deny such remedial assistance for one additional year to those few failure-prone fall-born children who, because of background factors alone, might require assistance regardless of when they start school. Second, it would delay access to school for an equal number of fall-born children who are already quite capable of mastering the demands of the primary school curriculum as the curriculum now stands.<sup>2</sup> Widespread screening, on the

other hand, can help avoid both of these consequences associated with raising the school entrance age. In addition, of course, it would provide an opportunity to identify not only those few fall-born children who are truly at-risk for school failure, but also the remaining group of at-risk children found largely among the older group of kindergarten entrants. Given these various considerations, it seems reasonable to conclude that raising the kindergarten entrance age is likely to be counterproductive when compared to the benefits that might be had by initiating a psychometrically based screening program followed by intervention procedures geared to the needs of the failure-prone child, independent of the child's chronological age at the time of school admission.

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TABLE 1. Pearson product-moment correlations obtained between the three predictors of school readiness (CA, PPSRT, DAMT) and the three criterion measures of academic achievement (CRMPRM, WRMT, KDAT) for males and females.

PREDICTORS	CRITERION MEASURES					
	MALES			FEMALES		
	CRMPRM (N=62)	WRMT (N=48)	KDAT (N=46)	CRMPRM (N=52)	WRMT (N=39)	KDAT (N=38)
CA	.31**	.12	.16	.11	.12	.29*
PPSRT	.51***	.40**	.59***	.68***	.68***	.66***
DAMT	.35**	.27*	.52***	.56***	.26*	.43**

\* p = .05

\*\* p = .01

\*\*\* p = .001

TABLE 2. Prediction of end-of-year promotion decisions using the school readiness cutoff points associated with CA, PPSRT and DAMT scores.

END-OF-YEAR PROMOTION DECISIONS			
PREDICTOR	FAILURE-PRONE (N=21)	TOP-PERFORMING (N=38)	
CA	POOR PROGNOSIS (under 60 months old)	(True Positive) 6 (29%)	(False Positive) 7 (18%)
	GOOD PROGNOSIS (60 months old and older)	(False Negative) 15 (71%)	(True Negative) 31 (82%)
PPSRT	POOR PROGNOSIS (score of 17 or more)	(True Positive) 17 (81%)	(False Positive) 8 (21%)
	GOOD PROGNOSIS (score of 16 or less)	(False Negative) 4 (19%)	(True Negative) 30 (79%)
DAMT	POOR PROGNOSIS (score of 0 or 1)	(True Positive) 14 (67%)	(False Positive) 3 (8%)
	GOOD PROGNOSIS (Score of 2 or 3)	(False Negative) 7 (33%)	(True Negative) 35 (92%)



TABLE 3. Pearson product-moment correlations obtained between the three predictors of school readiness (CA, PPSRT, DAMT) and the two criterion measures (DTKR, WRAT) of school readiness for males and females.

PREDICTORS	CRITERION MEASURES			
	MALES		FEMALES	
	DTKR (N=66)	WRAT (N=59)	DTKR (N=66)	WRAT (N=54)
CA	.28*	.30**	.18	.37**
PPSRT	.64***	.78***	.70***	.77***
DAMT	.69***	.73***	.50***	.64***

\* p = .05

\*\* p = .01

\*\*\* p = .001

TABLE 4. Prediction of DTKR performance ratings using the school readiness cutoff points associated with CA, PPSRT and DAMT scores.

PREDICTOR	DTKR PERFORMANCE RATINGS		
	FAILURE-PRONE (N=12)	TOP-PERFORMING (N=19)	
CA	POOR PROGNOSIS (under 60 months old)	(True Positive) 4 (33%)	(False Positive) 4 (21%)
	GOOD PROGNOSIS (60 months old and older)	(False Negative) 8 (67%)	(True Negative) 15 (79%)
PPSRT	POOR PROGNOSIS (score of 17 or more)	(True Positive) 12 (100%)	(False Positive) 0 (0%)
	GOOD PROGNOSIS (Score of 16 or less)	(False Negative) 0 (0%)	(True Negative) 19 (100%)
DAMT	POOR PROGNOSIS (Score of 0 or 1)	(True Positive) 9 (75%)	(False Positive) 0 (0%)
	GOOD PROGNOSIS (Score of 2 or 3)	(False Negative) 3 (25%)	(True Negative) 19 (100%)

TABLE 5. Prediction of WRAT performance ratings using the school readiness cutoff points associated with CA, PPSRT and DAMT scores.

PREDICTOR	WRAT PERFORMANCE RATINGS		
	FAILURE-PRONE (N=12)	TOP-PERFORMING (N=24)	
CA	POOR PROGNOSIS (under 60 months old)	(True Positive) 6 (50%)	(False Positive) 6 (25%)
	GOOD PROGNOSIS (60 months old and older)	(False Negative) 6 (50%)	(True Negative) 18 (75%)
PPSRT	POOR PROGNOSIS (Score of 17 or more)	(True Positive) 12 (100%)	(False Positive) 0 (0%)
	GOOD PROGNOSIS (Score of 16 or less)	(False Negative) 0 (0%)	(True Negative) 24 (100%)
DAMT	POOR PROGNOSIS (Score of 0 or 1)	(True Positive) 10 (83%)	(False Positive) 0 (0%)
	GOOD PROGNOSIS (Score of 2 or 3)	(False Negative) 2 (17%)	(True Negative) 24 (100%)

TABLE 6. Pearson product-moment correlations obtained between selected background factors and the fall-born kindergarten children's performance on the DTKR and on the WRAT.

BACKGROUND FACTORS	DTKR	WRAT
1) Mother's level of education	.45** (N=37)	.37* (N=31)
2) Number of children's books at home	.40** (N=40)	.39* (N=33)
3) Number of moves since child was born	.41** (N=40)	.47** (N=33)

\* p = .05

\*\* p = .01

\*\*\* p = .001

Table 7. Background factors that characterize the failure-prone and top-performing fall-born kindergarten children.

	Mean Number of Children's Books At Home	Mean Number of Moves since Child Was Born	Mother's Education (Mean Years of School Completed)
Failure-prone (N = 12)	9.5	2.58	9.9
Top-performing (N = 13)	19.5	.92	12.8

## Footnote

<sup>1</sup> Portions of the data presented below are also reported in Simner, 1983a. Minor differences in the reported sample sizes that appear in these two investigations stem from the fact that all of the children were not available for all of the tests used, in both investigations.

<sup>2</sup> It is worth mentioning that the advisability of implementing a change in the school entrance age, or for that matter, even maintaining the present policy of basing school admission decisions on age alone, might also be questioned on legal grounds in the future stemming from human rights legislation in both the United States and Canada. In other words, it is not unreasonable to assume that in years to come school admission decisions that derive from strict adherence to an age standard might be considered discriminatory and therefore unlawful in much the same way that many decisions based on age alone in the area of employment are recognized as unfair and illegal throughout most of North America. In fact, the Ontario Human Rights Code, 1981 (Chapter 53), now provides protection against discrimination on the basis of age not only in the area of employment but also in service areas including education. Accordingly, the Ontario Human Rights Commission is empowered to file a complaint on behalf of any person 18 years of age and older who is denied access to educational programs, such as medical school, when there is reason to believe that the denial is based on age alone. Should this legal protection in the area of education be extended to even younger ages and become more widespread in the future, it might be necessary to develop a flexible school admission policy whereby even a

57 month entrance age requirement will only serve as a guideline, and not as a strict criterion for determining a child's eligibility for kindergarten admission.