Social Policy Report

Giving Child and Youth Development Knowledge Away

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At What Age Should Children Enter Kindergarten? A Question for Policy Makers and Parents

Deborah Stipek

Summary

Research that bears on the issue of school entry policies is summarized in this report. The focus is on the age children should be to enter kindergarten and the potential benefits of delaying school entry for all or some children. The research reviewed uses three methodologies:

(1) comparing outcomes for children who have delayed entry by a year with children who entered school when they were eligible;

(2) comparing children in the same grade who have different birth dates; and

(3) comparing children who are the same age but in different grades, as well as children who are a year apart in age but in the same grade.

Findings suggest that studies using the first method are inconclusive because accommodations are not made for the selection factors associated with the decision to hold a child out of school. Findings from the other two methods suggest that relatively older children have a modest academic advantage over younger children in the first few grades of school, but that advantage typically disappears. There was no evidence suggesting that younger children gained less than older children from early school experience, and some evidence suggested that school experience produced greater gains on most cognitive dimensions. Generally, the findings reviewed provide more support for early educational experience to promote academic competencies than for waiting for children to be older when they enter school. The author suggests that the focus should be more on making schools ready for children than on making children ready for school.

Social Policy Report

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From the Editor

One purpose of *SPR* is to promote developmental approaches to policy issues. Too frequently policies ignore the developmental needs of the child. This has been especially true for the growth of mass public schooling in this country. The development of our educational system for children has been based on the agrarian calendar (which, e.g., is why we have a nine month schedule), on increases in the size of the population, and on labor needs, not on the developmental nature and needs of children. The Carnegie Corporation report *Turning Points* published in 1989, for example, documents how middle schools, which arose mainly due to growth in absolute school size, conflict with the developmental nature of the child. The child has to change school at a time when he/she is experiencing the biological, social, and emotional changes of puberty. The cumulative number of changes associated with a school transition at the same time can overwhelm the child. This is a singular example of the type of problem that can arise when the development of the child is not considered when we implement policies or change institutions involving children and youth.

The current issue of *SPR* addresses children's age of entry into school. Increasing numbers of children are entering school at younger ages. Many parents become concerned that their child is disadvantaged if he/she does not enter school as early as possible. The current article, however, finds that age of school entry does not much matter for children's later development. This finding must be partially qualified by the difficulties of such research. Because children are not randomly assigned to age of entry, experiments cannot be done, so causal arguments are challenging. Samples in some studies are small. Nonetheless, this article brings empirical research and careful scholarly thought to an issue much on the minds of parents, philanthropy, and educators. It shows how the developmental needs of young child should be the main factor driving changes in the early education of children.

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At What Age Should Children Enter Kindergarten? A Question for Policy Makers and Parents

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At what age should children begin school? Just a few decades ago the question was relevant to debates about compulsory education laws. But over time, compulsory education laws for school entry have become more symbolic than coercive. Today, even though school is not usually compulsory until the age of six (20 states) or seven (22 states), most children enter school when they are five years old.

Now the common question for policy makers concerns the specific age at which children should be *allowed* to enter kindergarten. Since compulsory education laws do not apply until at least a year after the age of eligibility, the dilemma for parents is whether to send their children to kindergarten as soon as they are eligible. The focus for both policy makers and parents is on determining when children are ready for school. Not discussed in this report, although perhaps a better question, is how do we make schools ready for children.

Current School Entry Policies & Practices

State Policies

The cutoff birth date for kindergarten entry is typically set by the state, although a few states give school districts discretion. Currently, the modal cutoff date is the beginning of September, about the time school begins (see Table 1).

The trend, however, has been to move the cutoff date up, so that children enter kindergarten older on average. Between 1975 and 2000, 22 states moved the birth date required for school entry to an earlier point in the year. Nine of those changes were made since 1990. One state (Indiana) changed its law from allowing districts to set their own age cutoff to a state requirement of June 1. Only one state (Idaho) changed in the opposite direction (from August 16 to September 1).

The reasons articulated in a 1999 California bill (AB 25: Article 1.5, 48005.10) for moving the birth date cutoff to earlier in the school year illustrate the rationale that is typically found in legislative summaries:

(A) By changing the age at which children generally enter kindergarten, California's children will be better prepared to enter into the academic environment that is required by the kindergarten curriculum.

(C) Comparisons between California pupils and pupils in other states on national achievement tests in the later grades are likely to be more equitable if the entry age of California pupils is more closely aligned to that of most other states.

Parental Practice

An increasingly common practice, which also raises the average age of kindergartners, is for parents to voluntarily delay their child's entry a year beyond the time he or she is eligible to begin school (sometimes referred to as academic "redshirting"). Brent, May, and Kundert's (1996) analysis of data for one school district over a 12-year period found steady increases in the use of delayed school entry from about 6% in the first block of three years to about 12% in the most recent block of three years. Recent surveys suggest that about 9 or 10 percent of parents nationally delay their children's entry into kindergarten (Brent et al., 1996; Cosden, Zimmer & Tuss, 1993; May, Kundert, & Brent, 1995; National Center for Education Statistics [NCES], 1997; Byrd, Weitzman & Auinger, 1997). Boys are more likely than girls to be held out, by a factor of nearly 2 to 1 (Brent et al., 1996; Cosden et al., 1993; May et al., 1995). And the closer children's birthdays are to the cutoff date (and thus the younger they would have been if they had entered when the law allowed), the more likely they are to be held out (Cosden et al., 1993; Graue & DiPerna, 2000; May et al., 1995; Mayer & Knutson, 1999; NCES, 1997).

The evidence on race and socio-economic status (SES) differences in delaying school entry is mixed. Studies have reported that Caucasians were more likely to be held out than African-Americans (NCES, 1997) and Latinos (Cosden et al., 1993). Some studies report that middle-class parents

Table 1 Date by Which Child Must Turn Five Years to Enter Kindergarten

Date	Number of States
June 1	1
July 1	1
August 1	1
August 15	1
August 31/September 1	22
September 10-15	4
September 30/October 1	6
December 1-2	3
December 31/January 1	6
LEA Option	5

Source: Education Commission of the States, March 2000; Denver, CO (www.ecs.org).

are more likely to hold their children out than low-income parents (see Meisels, 1992). Other studies that have assessed SES effects report no differences (Graue & DiPerna, 2000; NCES, 1997; Morrison, Griffith, & Alberts, 1997)

Likely Directions in Policies and Practices

The current emphasis on school accountability based primarily on students' performance on achievement tests is likely to encourage more states and districts to consider increasing the age of school entry. The reasoning, seen in the excerpt from the California bill mentioned above, is that if older children benefit more from instruction than younger children, achievement gains could be realized by requiring children to be older when they entered kindergarten. This is a politically attractive strategy for raising test scores because it is simple and economical.

Another current policy trend, eliminating social promotion, puts additional pressure on educators to ensure students' academic success, especially in the early elementary grades, when retention rates are the highest. If older children are better able to master the curriculum, fewer would need to be retained.

The current emphasis on school accountability based primarily on students' performance on achievement tests is likely to encourage more states and districts to consider increasing the age of school entry.

School-level practices are also likely to be affected by current accountability pressures and the elimination of social promotion, especially in states in which school resources are based on students' achievement test scores. Studies of kindergarten teachers show that the majority endorse later school entry for children who appear not to be ready for kindergarten (NCES, 1997). The pressure to increase test scores may encourage teachers to advise more parents to hold out relatively young children, especially boys, who they consider to be at risk of poor achievement. Parents' concerns about the increased likelihood of their child being retained may also result in an increased number of children being held out for a year. In brief, the current educational policy climate suggests that the trend toward raising the school entry age is likely to continue both formally, in state legislation or school district policies, and informally, in parent decisions.

The Substance of the Debate

The argument for moving the birth date cutoff earlier, so that children enter kindergarten at an older age, is based on the assumption that with age come competencies that will improve children's chances for success in school. Although intellectual competencies are often the focus, other dimensions of development are often included. The National Goals Panel 2000, for example, considers physical well-being; motor, social, and language development; and dispositions for learning as relevant to school readiness, in addition to cognition and knowledge (Kagan, Moore, & Bredekamp, 1995). Older children are assumed to be more *ready* and better able to profit from formal schooling (see Frick, 1986; Uphoff & Gilmore, 1986). The claim that older is better is based on a theory of development which privileges the contributions of biological maturation (see Kagan, 1990; Meisels, 1999; Smith & Shepard, 1988). Thus, voluntary delayed entry is more common among boys, because they are believed to mature more slowly than girls.

In some discussions of school readiness there is an implicit notion of a threshold of cognitive and social development. It is not assumed simply that "older is better," but rather, older is better until children achieve that prerequisite level of development that is required for them to succeed in school. That threshold is associated with a particular age.

Also implicit in the theory underlying policies and practices that delay school entry is the notion that the "gift of time" and general (out-of-school) experience outweigh the benefits of a school setting for a child deemed unready for kindergarten. This assumption has particularly important implications for low-income and minority children, who begin school on average with substantially lower academic skills than children from middle- and upper-income families (Adams, 1990; Stipek & Ryan, 1997; Whitehurst et al., 1994). An important policy question is under what conditions are these children at risk for school failure most likely to catch up with their more affluent peers? Are they better served by having more time out of school or by having more time in an instructional environment?

Early childhood education experts who oppose the trend toward later school entry stress the role of experience in learning and development. Their argument is based on the assumption that time in an instructional context is more valuable and will promote academic success better than additional biological maturation or than general experience out of school. The two positions on the issue of school entry age thus mirror rather well the age-old nature-nurture debate.

Experts who privilege experience over maturation also point out that development is uneven and multidimensional. A threshold for development cannot be established because

a child's level of development varies across different dimensions. Thus, children are not likely to achieve the level considered important for school success in all domains at the same time.

The two positions also differ on where the responsibility for children's success resides. Proponents of delayed school entry for some if not all children focus on the preparation of the child for the program. Opponents argue that the policy is based on a Procrustean notion that the curriculum is set and children must be fit into it as it is. A more appropriate strategy is to adapt the curriculum to the developmental levels of the children who enter kindergarten, whatever their cognitive and social skills. They take the position that if children are faring poorly in kindergarten programs, the solution needs to be found in the school program not in the child.

Critics of voluntary delayed school entry are also concerned that the practice will exacerbate socioeconomic differences in academic skill levels. They reason that middle-class families are more likely to have financial resources for an extra year of preschool or high-quality childcare, and thus are more likely to hold out their children. This would effectively make middle- and upper-income kindergartners older, on average, than kindergartners from low-income families. The increased age of the middle-income children raises expectations and puts pressure on kindergarten teachers to increase the demands of the kindergarten curriculum, which puts low-income children at an even greater disadvantage.

Finally, experts who argue against holding children out point out that being "over-age" for grade is a strong predictor of later dropping out, even when achievement is held constant (Meisels, 1992). The practice of holding children out a year thus puts some children at risk of not completing high school.

Fortunately, this is a debate that can be informed by empirical evidence. There is a fair amount of research that directly addresses the assumptions on both sides. To that data we now turn.

Effects of Entry Age

Three strategies have been used to assess the effects of the age of school entry on children's academic achievement, and occasionally on social-emotional or motivational outcomes. First, studies have compared children who have delayed entry by a year with children who entered school when they were eligible. These studies are relevant to policy decisions about formal cutoff dates only inasmuch as they allow comparisons of children who are relatively old versus relatively young at school entry.

A second methodological strategy is to simply compare children in the same grade with different birth dates. In any one grade there is at least a 12-month spread in ages. Assuming that children's birth dates are randomly distributed, associations between this natural variation in age of entry and child outcomes suggest an age effect. Few of the studies using this methodology assess change in achievement over the school year; they therefore cannot be used to determine whether older children benefit relatively more from schooling than do younger children. They do, however, provide information on whether older children perform better on average than younger children.

The third and most powerful strategy compares children who are the same age but in different grades as well as children who are a year apart in age but in the same grade. This strategy provides information on the relative effects of an additional year of time (maturation and general, out-of-school experience) versus an additional year of schooling.

Tables 2, 3 and 4 summarize all studies after 1980 that were performed using these three methodologies. A cutoff of 1980 was used because there is some question about the relevance of data collected earlier when relatively few young children attended preschool or had day care. The review of research in this report is thorough, but not exhaustive. (Note: equal signs in the tables reflect a finding of no significant differences between the groups compared.)

Delayed versus On-Time Entry

Does delaying relatively young children's entry into kindergarten a year past the time they are eligible to enter increase their chances for success? Researchers have reasoned that if delayed school entry is beneficial, children who are held out a year should have lower retention rates and special education placement and higher achievement than children with similar characteristics who entered school when they were eligible (see Table 2).

The findings of such studies need to be interpreted very cautiously. Children who are held out of school do not represent a random sample, and it is very likely that qualities that led parents to decide to delay their child's entry into school contribute to differences found later between these children and children who began school "on time." Moreover, a finding of no difference is difficult to interpret because children who had been held out might have looked worse if they had not been held out. Retention is especially suspect as a dependent variable because it is possible that teachers are more reluctant to retain children who are already relatively older than their age-mates.

In addition to these methodological problems, findings from research are neither substantial nor consistent. One study found that children who delayed school entry by a year were less likely to be retained than children who entered school when they were eligible (May et al., 1995). Two

Table 2 Studies Comparing Delayed and Non-Delayed Entry Students

Reference	Sample	Comparison	Consequences of Delayed Entry
Byrd, Weitzman, & Auinger (1997)	National representative sample in National Health Interview Survey; ages 7-17; N=9079	*Delayed-entry* (old for age in grade, but never retained); *Control* (modal age for grade and not retained)	*Behavior Problem Index (BPI)*: Delayed entry group> non-delayed (difference especially large in adolescence)
Graue & DiPerna (2000)	Representative stratified random sample of Wisconsin school districts; 3rd graders; N=8595	*Redshirters* (entered kindergarten >= 72 months); *Control* (entered 60-71 months)	*Early exceptional needs services:* Redshirters 2.24 times > control group *3rd grade reading achievement:* Redshirters (including summer birthdays) = control group
May, Kundert, & Brent (1995)	Caucasion 1st - 12th graders in suburban NY school district; N=3238	*Delayed entry* (entered K one year later than eligible for Dec. 1 cutoff); *Control* (entered when eligible)	*Retention*: delayed entry < control *Placement in special education:* delayed entry > control
Kundert, May, & Brent (1995)	Caucasion 3rd - 12th graders in suburban NY school district; N=314	*Delayed entry* (entered K one year later than eligible for Dec. 1 cutoff); *Retained* (in grades K-5)	*Cognitive Abilities Test (CAT) at 2nd grade:* delayed > retained; *CTBS Tests at 2nd, 5th, & 7th grade* (with CAT covaried): delayed = retained

studies, however, reported that children who delayed school entry by a year were more, not less, likely to receive special education services (Graue & DiPerna, 2000; May et al., 1995). The two studies that examined academic achievement did not find significant differences between delayed- and non-delayed entry children (Graue & DiPerna, 2000), or delayed and retained children (Kundert, May, & Brent, 1995). But, as mentioned above, it cannot be determined whether the delayed children would have performed less well if they had not been delayed.

The findings of the Byrd et al. (1997) study are noteworthy because it is one of the few studies that examined possible long-term effects of delaying school entry. In their nationally representative and large sample there were increasing disparities in behavior problems between children who were older than their age-mates and children who were the modal age for their grade. Adolescents who were older because of retention had particularly high scores on the Behavior Problem Index, but children who had not been retained (and were thus presumably older because they had delayed school entry) also showed relatively high levels of behavioral problems. Mayer and Knutson (1999) did not look specifically at students who were over-age, but they too found that in a large nationally representative sample of 8-11 year olds, children with earlier birth dates (who were relatively old) showed more behavior problems than children who were relatively young for their grade (see Table 3). Again, the selection problem of the children who delay school entry makes interpretation of these findings difficult. But they suggest the importance of studying the experiences of older children that might contribute to behavioral problems. It is also possible that the relatively high levels of behavioral problems, and accompanying negative experiences and alienation among children who are over the modal age of their grade, is related to the high levels of over-age students dropping out of high school (House, 1989; Nason, 1991).

Age Differences

Interpretation of findings of studies examining naturally occurring age variations are less problematic than for the delayed-entry studies because birth dates are presumably randomly distributed. Although there is some variation across states and districts, most studies are done within a limited geographical area, in which case variation in children's ages would depend on their birth date, not the state or district policy. In large-scale or national studies, it is unlikely that district policies bias the findings in any systematic direction.

Table 3 Studies Assessing Child Outcomes Associated with Age of Kindergarten Entry

Reference	Sample	Comparison	Consequences of Age of Entry
Bickel, Zigmond, & Strayhorn (1991)	Pittsburgh 5th graders; N=222	Age as continuous variable over 12 months	*Math achievement: 1st grade entry:* older > younger; *5th grade:* no sign. age effect *Reading achievement & conduct:* no sign. age effect at any grade
Breznitz & Teltsch (1989)	Israeli 4th graders; N=137	*Older* (birth date, Jan. - March), *younger* (Oct. - Dec.)	*Reading & arithmetic achievement:* older > younger; *trait anxiety:* younger >older; *self esteem & socio-metric scores*: older = younger
Cameron & Wilson (1990)	N=315	(1) *Redshirts* (2) Sept. - Jan. birth dates; (3) Jan. - May; (4) May - Sept.	*Second-grade ITBS:* Sept-Jan > other three groups; *Fourth grade:* Sept-Jan > May-Sept.
Crosser (1991)	7th, 8th, & 9th graders in Ohio school districts; N=90	All summer birth dates (June 1-Sept. 30): (1) *young* (entered K at age 5); *old* (entered K at age 6)	*5th & 6th grade CTBS; reading:* older > younger (boys only); *math*: older = younger
Dietz & Wilson (1985)	Second graders in a Delaware school district; N=117	Three groups based on age at school entry: mean ages of 62, 66, & 71 months	*K readiness scores & ITBS achievement scores:* no significant age effects
Jones & Mandeville (1990)	South Carolina, grades 1, 2, 3, & 6; N=190,292	*Younger* (birth dates in Aug., Sept., or Oct.), *Older* (all other)	*South Carolina Basic Skills Assessment Program (BSAP):* older > younger; age effect declines from grade 1-6
Kinard & Reinherz (1986)	White, working-class 4th graders; N=488	Divided into 6, 2-month intervals, based on birth dates at school entry	*Information processing skills: at school entry:* older>younger; *K, 3rd, & 4th*: no significant age effects. *Grade, attention, anxiety & other socio-emotional measures, academic achievement & special needs services:* no significant age effects
Langer, Kalk, & Searls (1984)	9-, 13-, and 17-year olds; N=97,000 Caucasion and 17,000 Black students assessed in 1974-78	Age as continuous variable over 12-months	*National Assessment of Educational Progress: 9-year olds*: older>younger; *Retention*: younger>older; *13-year olds:* age effect significant, but much weaker; *17-year olds*: no age effect
McClelland, Morrison, & Holmes (2000)	White & Black children, K & 2nd; N=164	Age of K entry used as continuous variable	*IQ, PIAT, PPVT:* predicted by school entry age at K, but not at 2nd grade
May & Welch (1986)	Grades 3-6 in suburban school district: N=152	Birth dates divided into 4, 3-month intervals	*Gesell at K:* oldest > youngest; *Stanford Achievement Test at 2nd or 4thgrade*: no significant age effects

Table 3 continued on next page

Table 3 continued Studies Assessing Child Outcomes Associated with Age of Kindergarten Entry

Reference	Sample	Comparison	Consequences of Age of Entry
Mayer & Knutson, (1999)	(a) 1980 census data on wages of men between 28-34 (b) CNLSY[1] 8-11 year olds	Birth dates: (1) Jan-March, (2) April-June, (3) July-Sept.	(a) *Adult earning:* Youngest (July-Sept.) had highest earnings. (b) *Behavior problems in 8-11-year olds*: older > younger *Reading and math achievement (PIAT):* younger > older
Spitzer, Cupp, & Parke (1995)	(a) Kindergartners; N=512 (b) Kindergartners; N=116	Age of entry as continuous variable	(a) *Teacher and peer ratings of social skills and popularity:* low but significant correlations with age of entry (b) *Teacher ratings of dependence:* significantly correlated with age of entry; *Peer rejection, loneliness, perceived competence and acceptance, and classroom behavior (CBI);* not significantly correlated to age
Stipek & Byler (2001)	predominantly poor children in rural and two urban communities, K-3rd grade (longitudinal); N=237	(a) *Old* (age 6 by Dec. 31 year entered K); *Intermediate* (age 5 by May 31 before K entry); *Young* (age 5 after May 31) (b) 54 pairs of children matched in age but one grade apart (K or 1), all children retested in their 3rd grade	(a) *Math & literacy tests, K/1:* oldest> youngest; *3rd grade:* no differences *Teacher achievement and social-behavioral ratings:* no age differences at K/1 or 3rd grade *Child self-ratings*: no differences at K/1 or 3rd grade (b) *math achievement*: 1st > K (matched on age); 3rd: older (late school entry) = younger (early school entry) *literacy achievement:* 1st = K; 3rd grade: younger = older *child self ratings in math & literacy:* 1st > K; 3rd: younger = older
Sweetland & De Simone (1987)	6th grade, upper-middle-class suburban school district: N=152	Birth dates divided into 4, 3-month intervals	*CTBS, grades 2-6*: older>younger (degree of difference declined after 3rd grade)

[1] National Longitudinal Survey of Youth, mother-child files

The findings related to the effect of age-of-school-entry on achievement vary, but looking across studies, the pattern is clear. Most studies report differences in the beginning grades of school which favor older children (Cameron & Wilson, 1990; Crosser, 1991 [boys only]), and some studies report differences in the later elementary grades (Breznitz & Teltsch, 1989; Cameron & Wilson, 1990; Crosser, 1991). But a few studies found no difference in some or all achievement tests, even in kindergarten (Dietz & Wilson, 1985; Kinard & Reinherz, 1986). And in most of the studies that found significant age differences in the early grades, the differences were weaker (Jones & Mandeville, 1990; Langer, Kalk, & Searls, 1984; Sweetland & De Simone, 1987) or disappeared altogether by the upper elementary grades (Bickel, Zigmond, & Strayhorn, 1991; Kinard & Reinherz, 1986; McClelland, Morrison, & Holmes, 2000; May & Welch, 1986; Stipek & Byler, 2001).

In summary, the empirical evidence suggests some small advantage of being relatively older than classmates which diminishes with age. This does not mean that "older is better" in some absolute sense. All of these studies used relative age as the independent variable. Depending on the birth-date cutoff in the state or community, a relatively old child in one study could have been an average-aged child in another study. The findings also do not suggest that older children learn more in school than younger children. The age

Table 4 Studies Comparing Age and Schooling as Predictors of Cognitive Outcomes

Reference	Sample	Comparison	Age and Grade Effects
Bisanz, Morrison, & Dunn (1995)	N=56	*Old K* (turned 6 just after cutoff date); *Young 1st graders* (turned 6 just before cutoff date); *Old 1st graders* (turned 6 before cutoff date, but a year older than old K)	*Arithmetic accuracy*: schooling effect significant; *Conservation:* age effect significant
Cahan & Davis (1987)	Israeli 1st & 2nd graders; N=6269	Compared age effects within grade to grade (schooling) effects (between grade, holding age constant)	*Math & reading comprehension*: effect of one year of school twice the effect of one year of age
Cahan & Cohen (1989)	4th, 5th, & 6th graders; N=12,090	Compared age effects within grade to grade (schooling) effects (between grade, holding age constant)	*12 cognitive tasks (CAT)*: school effects larger on all verbal and numerical tests and 2 of 5 figural tests; age effects modestly larger on 2 figural tests
Crone & Whitehurst (1999)	Children originally enrolled in New York Head Start Centers; N=337	Within-grade comparison: *Youngest* (Oct. - Nov. birth dates); *middle* (Feb. – Sept.); *Oldest* (Dec. – Jan.) Between-grade comparison: approx. same age (e.g., youngest in one grade, oldest in previous grade)	*Emergent literacy skills: within grade comparison: preschool & K*: older > younger (difference smaller in K); *1st & 2nd*: no significant age differences *Between-grade comparison*: youngest K > oldest preschool; youngest 2nd > oldest 1st
Ferreira & Morrison (1994)	Middle-class Canadians, identified by teachers as "average"; N=48	*Less schooled* (started K at 5 yrs 7 mos); *more schooled* (started 1st at 5 yrs. 9 mos.); retested one year later (in K or 1st) and two years later (in 1st or 2nd)	*Grammar tasks involving multiword subjects:* 1st>K, 2nd>1st (schooling effect); *pronouns*: age 7>6=5 (age effect)
Morrison, Griffith, & Alberts (1997)	Diverse SES; N=539	*Old K* (turned 6 just after cutoff date); *Young 1st graders* (turned 6 just before cutoff date); *old 1st graders* (turned 6 before cutoff date, but a year older than old K)	*Math & reading achievement, end of K or 1st:* young first>old K; old and young 1st graders made same gains, both greater than old K (schooling effect--greater for reading than math); *end of 1st grade:* old 1st>young first (age effect)
Morrison, Smith, & Dow-Ehrensberger (1995)	Middle- to lower-middle class; N=20	*Young 1st graders* (turned 6 just before cutoff date); *old K* (turned 6 just after cutoff date)	*Memory tasks, phonemic segmentation, reading achievement:* pretest: no group differences; end of year: 1st>K (old Ks made little progress in K, & no more improvement during 1st than young 1st graders)
Varnhagen, Morrison, & Everall (1994)	N=79	*Young 1st graders* (turned 6 just before cutoff date); *old K* (turned 6 just after cutoff date)	*Story recall and story production skills:* associated with age, not schooling; *Causal relations recall, and complexity of stories produced:* associated with schooling

differences, when found, were usually stronger at the beginning of school than in the later grades, indicating that the younger children actually tended to learn more, often catching up with their older peers after a few years in school.

The proportion of risk attributed to race and socioemotional factors was 13 times larger than that contributed by age.

Even in the early elementary grades the magnitude of the effect of age appears to be small. Most studies do not compare age to other factors influencing student achievement, but in one that did, the proportion of risk attributed to race and socioeconomic factors was 13 times larger than that contributed by age (Jones & Mandeville, 1990).

Only a few studies have examined associations between age of entry and social-motivational variables. One study of a small sample of Israeli fourth graders found that younger children scored higher on a measure of trait anxiety; there were no age effects on self-esteem or socio-metric scores (Breznitz & Teltsch, 1989). Teacher ratings of children's social skills and popularity were associated with age of entry in one study, with older children receiving higher scores (Spitzer, Cupp, & Parke, 1995). Peer rejection, loneliness, perceived competence, and classroom behavior were not associated with age. Two studies found no age effects on attention, anxiety, and a variety of social-emotional measures for children from kindergarten through third (Stipek & Byler, 2001) and fourth grade (Kinard & Reinherz, 1986). Taken together, the research provides little support for concerns about the social-emotional or motivational development of children who enter school at a relatively young age.

Schooling versus Age

The studies that are most relevant to the age-of-entry debate compare the effects of a year of maturation and general experience (out of school) to a year of schooling. As mentioned above, this analysis is done by comparing children who are the same age but in different grades and children who are in the same grade but approximately a year apart in age. The first comparison provides information on the effect of a year of schooling, holding age constant. The second comparison provides information on the effect of chronological age, holding the number of years of schooling constant.

Findings from studies using these methods suggest that schooling is the more potent variable in most of the cognitive skills measured. In math and most aspects of reading and literacy in most studies, children who were in school gained more in a year than children the same age who were not in school (Bisanz, Morrison, & Dunn, 1995; Cahan & Davis, 1987; Crone & Whitehurst, 1999; Ferreira & Morrison, 1994; Morrison et al., 1997; Morrison, Smith, & Dow-Ehrensberger, 1995; Varnhagen, Morrison, & Everall, 1994). Literacy assessments in these studies included basic reading skills as well as grammar, phonemic segmentation, causal relationships recall, and complexity of stories produced. The findings of two additional studies suggest, furthermore, that age was not a factor in how much children benefited from a year of schooling (Morrison et al., 1997; Morrison et al., 1995).

Age was a better predictor than amount of schooling for children's performance on conservation tasks in one study (Bisanz et al., 1995), two of five figural tests given in another study (Cahan & Cohen, 1989), use of pronouns (Ferreira & Morrison, 1994), and story recall and production skills (Varnhagen et al., 1994) in two other studies, repectively. Thus, biological maturation and general, out-of-school experience appear to be more important contributors to some cognitive competencies.

Although chronological age was more strongly associated with a few cognitive outcomes, the studies comparing age and school effects suggest that educational intervention found in schools contributes more to children's cognitive competencies overall than does maturation, and that relatively young children benefit from school as much as relatively older children. The school effect is strong in an absolute as well as a relative sense. In the Crone and Whitehurst (1999) study, for example, a year in school explained 62% of the literacy skill improvements at the kindergarten level, and 81% at second grade. Cahan and Davis (1987) report that the effect of a year in school was twice the effect of a year of age.

An Illustrative Study

Most studies conducted on entry age into kindergarten include predominantly middle-class children. But as mentioned above, policy decisions related to age of entry are particularly critical for low-income children because they are at greatest risk for school failure. As an example of research on age of school entry I describe next one of my own studies, which focuses on very low-income children (see Stipek & Byler, 2001). [1]

The study involved 237 children in three different geographical locations: a northeastern, predominantly white rural community, a northeastern, predominantly African-American urban community, and a western, predominantly Latino urban area. The children were distributed among more than 80 schools and 150 classrooms.

In addition to examining academic achievement, we assessed age differences in children's perceptions of themselves and of school. We reasoned that if younger children perform less well academically than older children, they might also have relatively low perceptions of their academic competencies, develop a less positive relationship with their teacher, and enjoy school less.

The study's longitudinal design provided data on children from kindergarten through the third grade. We were therefore able to determine whether any differences evident in kindergarten persisted into the middle elementary grades. Because concerns about maturity are often greater for boys than for girls, gender differences were also examined. We had also planned to examine redshirting practices, but in the sample of over 200 low-income children, only five children (four boys and one girl) delayed kindergarten entry.

For all of the children in the sample we had Peabody Picture Vocabulary Test (PPVT) scores from the time children were 60 months old. At the end of kindergarten or first grade and again in third grade we gave both math and literacy assessments, using a combination of traditional and more reform-minded (e.g., strategies for solving word problems, verbal comprehension and writing) achievement tests. Teachers also rated children's math and reading performance in class.

Using the Feelings about School measure (Valeski & Stipek, 2001), children rated their academic competencies and their feelings about school and their teacher. Teachers rated children's social competence and academic engagement on tasks, and the level of closeness and conflict in their relationships with each study child.

We used two strategies to assess age of entry effects. First, children were divided into three age groups: (1) *old* (*n* = 77; turned six by December 31 of the year they entered kindergarten); (2) *intermediate* (*n* = 98; turned five by May 31, before they entered kindergarten); and (3) *young* (*n* = 62; turned five after May 31 and before they entered kindergarten or in the fall after entering kindergarten).[2] Second, we compared two groups of children matched in age but a year apart in grade.

The studies comparing age and school effects suggest that educational intervention found in schools contributes more to children's cognitive competencies overall than does maturation.

The first set of analyses of children in kindergarten revealed that the oldest children scored significantly higher than the youngest children on both the reading and math achievement tests, but no differences were found for teacher ratings of academic performance. The three age-groups were not significantly different from each other on all of the teacher ratings of children's social competence, academic engagement, and their relationships with children. Only one child rating was significantly associated with age; the oldest children reported more positive feelings about their teacher than the intermediate-age and youngest children. When the same age comparisons were computed for children when they were in the third grade, the early achievement advantage of the older group on the math and literacy achievement tests disappeared, although older children's more positive ratings of their teacher remained.

The second analytic strategy was to create a matched sample of 54 pairs of children who were the same age, gender and race, but in different grades (kindergarten versus first grade). This allowed us to assess the effects of a year of schooling holding age constant. The children who entered school very young (who were in first grade at the first time of testing) were achieving at a significantly higher level in math, but not in literacy, than children who entered school a year older (who were in kindergarten at the time of testing, but the same age as the first graders). The first graders also had significantly higher perceptions of their skills in both math and literacy. No other child outcomes showed significant differences.

Identical analyses were repeated for these children's third-grade outcomes. For these analyses the children were all in the same grade, but the two groups differed in age by a year. The achievement advantage in math shown by the first graders over same-aged peers in kindergarten was not apparent when all of the children were in the third grade. Combined, these two findings suggest that the earlier advantage of the children who had entered school at a relatively younger age was a consequence of having an additional year of schooling. Likewise, the two groups were not significantly different on any of the child self-ratings or teacher ratings. Thus, by third grade, children who entered kindergarten an entire year apart in age did not differ significantly on the variables we measured.

In brief, the findings of this study are consistent with the pattern of findings in previous studies. Comparing the contributions of time (chronological age) and academic skills, school was more potent. Furthermore, children who

entered school relatively young did not appear to be disadvantaged academically in the long run.

Returning to the Policy Question

What are the implications of the findings reviewed above for the original question: at what age should children enter school? Briefly, the data indicate that moving back the birth date for school entry by one to three months—the most common change seen over the last decade—will not address policy makers' concerns about student readiness for kindergarten or their academic performance later on.

Studies comparing the academic achievement of children who differed by as much as a year in their school entry age have found no differences or very modest and diminishing differences. There is also no evidence suggesting some kind of threshold—a particular age at which most children are prepared for formal schooling.

Possible negative effects of raising the school entry age must also be considered. Requiring children to be older when they enter kindergarten increases teachers' expectations for their ability to handle structured academic work. Combined with the current stress on children's standardized achievement test performance, there is a risk that kindergarten will begin to resemble first grade and be less and less developmentally appropriate.

What about delaying school entry for some children? Only a few studies have examined the effects of voluntarily delaying children's entry into kindergarten. The evidence that exists does not support this practice as a general rule. But the evidence is too meager and open to interpretation to be used as a guide for individual decision making. Although evidence on age differences suggests that younger children are not necessarily disadvantaged, little is known about the consequences of delaying entry for the selective sample of children who have done so.

Delaying school entry for children, whether by changing the law or through parents' voluntary decisions, may, however, be disadvantageous for low-income children, who already begin school with relatively poor cognitive skills. First, the evidence is very clear that out-of-school time contributes to the racial and social class achievement-gap more than does in-school time. It is during the summer, for example, that low- and middle-income children's achievement diverges the most (Entwisle & Alexander, 1992). Second, middle-income children are also more likely to attend high-quality preschool or day care programs, which have been shown to contribute to children's language and other cognitive skills (Bowman, Donovan, & Burns, 2001). There is, therefore, reason to expect children from middle-class and affluent families to progress more in their academic skills than low-income children while they "wait" to become eligible to begin kindergarten, thus making the gap in skills wider than it already is at school entry. Children with special needs are especially disadvantaged by delaying entry into a formal educational setting because they are less likely to be identified and receive early intervention.

Are Readiness Tests a Good Alternative to Age as a Criterion for School Entry?

If age, at least within the range of about 12 months, is not a good predictor of how much children benefit from school, should we consider alternative strategies to determine when children should begin kindergarten? What about a test that directly assesses children's readiness for school?

School readiness tests are used in many districts and schools for a variety of productive purposes, such as to identify special problems that might require early intervention. Early assessments can also be used by teachers to guide instructional and program planning. The research evidence does not, however, support readiness tests as an alternative to age for determining school entry.

Extant readiness tests assess social interaction skills, general cognitive skills (e.g., perceptual skills, auditory memory, visual matching, language, and listening), and specific academic knowledge (e.g., alphabet, color naming, counting, identification of body parts). Social knowledge tests have been criticized for being culturally biased (Meisels, 1996), and many other tests have been criticized for having poor validity (Shepard & Smith, 1986; Meisels, 1996). When the widely used Metropolitan Readiness Test is used for individual placement, it is estimated that about one-third of all children tested would be misidentified (Gredler, 1992; see also Carlton & Winsler, 1999). Researchers have also pointed out that development is episodic and uneven (Bowman et al., 2001; Cronbach, 1990), rendering assessment at any single point in time a poor predictor of a child's skills, even a short time later. Another problem is that readiness tests that include items which require teaching (e.g., color and shape names, letter identification, factual knowledge) unfairly disadvantage children who have not

The research evidence does not support readiness tests as an alternative to age for determining school entry.

been taught them. Ironically, these are the children who most need the instruction kindergarten programs can provide.

Furthermore, readiness tests do not assess the qualities kindergarten teachers view as important for school success. In a national study that asked kindergarten teachers how important each of 15 qualities was for a child to be ready for kindergarten, teachers rated highest: (1) "is physically healthy, rested, and well-nourished;" (2) "can communicate needs, wants, and thoughts verbally in child's primary language," and (3) "is enthusiastic and curious in approaching new activities, respectively (NCES, 1993). The qualities most often found on readiness tests were rated the lowest of the 15 mentioned: (1) ability to identify primary colors and basic shapes; (2) ability to use pencils and paint brushes; (3) knowledge of the alphabet; and (4) ability to count to 20. (See also Piotrkowski, Botsko, & Matthews, 2000.)

A more fundamental problem with "readiness" tests concerns the concept of readiness itself. Their use as a criterion for school entry is implicitly based on the premise that children are not able to take advantage of school until they are "ready," and that biological maturation (time) and experience outside of school prepares them better than experience in a school context. The evidence reviewed above supports neither of these assumptions.

The meaninfgul question is not whether *a child is ready to learn, but rather* what *a child is ready to learn.*

Rethinking "Readiness"

Many early childhood experts have called into question the very notion of "readiness." Clearly all children at all ages are "ready to learn." The meaningful question is not *whether* a child is ready to learn, but rather *what* a child is ready to learn. Even "reading readiness" – a concept with a long history in early childhood development – has little meaning in the context of current conceptualizations of emerging literacy, which includes general knowledge, language and vocabulary skills, and even early scribbling. Literacy, according to current experts, begins to develop long before children enter school (Bowman et al., 2001; National Research Council, 1998). Current conceptions of mathematics also embrace the notion of gradual development beginning early in life. Recent work on the development of mathematical understanding shows that an understanding of basic number concepts is seen and can be promoted in toddlers (Griffin & Case, 1998).

The concept of readiness for school is also losing significance as increasing numbers of children attend preschool or day care programs. Research on early childhood interventions and especially on programs designed to promote cognitive skills provides compelling evidence that preschool-aged children learn in a variety of school-like settings and from a variety of instructional approaches (see Barnett & Boocock, 1998; Bowman et al., 2001). Ideally, the transition from preschool programs to kindergarten and formal schooling should be seamless and continuous, not the abrupt shift to a completely different social context and set of academic demands that the notion of readiness brings to mind.

Many early childhood experts have turned the issue of readiness on its head to focus on schools rather than children (see, for example, Graue, 1993; Kagan, 1990). To be sure, some children are not "ready" to sit at desks and do paper-and-pencil activities for long periods of time when they turn five or even six years old. But that doesn't mean that they cannot benefit from any kind of instruction. The appropriate policy question, then, is not what children need to know or be able to do when they get to school, but what schools need to do to meet the social and educational needs of the children who walk through their doors.

Policy Implications

In summary, the research reviewed in this report does not support a policy of moving the birth date for school entry to increase the average age of children entering school. Even if the goal is to improve children's performance on achievement tests, policies that result in a slightly older school population will have short-term and modest effects, if any.

A policy issue that is related to school entry age concerns the advisability of making kindergarten compulsory. The research summarized in this report provides good evidence for the value of an educational program for five-year-olds. The value of making kindergarten compulsory depends on whether it would actually impact kindergarten enrollment. Enrollment is already very high, and many parents who currently do not enroll their children in kindergarten use other educational options (preschools or home schooling), which would most likely continue through a waiver process even if kindergarten was made compulsory. Nevertheless, although compulsory kindergarten laws may be largely symbolic, evidence for the value of schooling for children who are kindergarten age is consistent with such a policy.

Despite the limitations of age as a predictor of children's cognitive and social competencies, from a policy perspective

it is preferable to using tests as a criterion for school entry. Age is equitable and less vulnerable to cultural or social class biases. Within the range of options currently used, the particular birth date that is used as a cutoff is somewhat arbitrary.

If anything, the evidence suggests reducing the age of school entry to below the current range. Some of the studies reviewed show that the youngest children who currently enter school, young five-year-olds and some four-year-olds, do benefit from their experience in school and in fact learn at the same rate as children who are older when they enter school. Studies comparing "time" versus "school" on children's cognitive skills provide substantial evidence for the advantage of an educational setting. Combined with findings not reviewed in this report, which demonstrate the benefits of quality day care and preschool programs (Bowman et al., 2001), an argument is easy to make for providing educational experiences for four-year-olds—either in schools or in other settings. Because low-income children are the least likely to be able to pay for high quality programs, and because they enter school on average with lower academic skills, limited public funding should be focused initially on this group.

Whether children would benefit more from beginning school earlier or attending a preschool program is debatable. I suspect that young children's needs would be better served in preschool programs, at least while schools are under current extreme pressures to produce high scores on achievement tests. But the important issue is not where young children's educational needs are met, but whether the programs they are offered are of high quality and appropriate for their developmental level.

Fortunately, a great deal is known about the characteristics of high quality, developmentally appropriate programs which address the needs of children, whatever their entering skill levels (see Bowman et al., 2001). Quality programs, however, require quality teachers. Changing the school entry age, in either direction, will not reduce the variability in children's academic and social skills. Whatever the age of entry, there will be at least 12 months between the oldest and the youngest children, and teachers will need to address a wide range of social and learning needs.

We would do a much greater service to children if we focused more on making school ready for children than on making children ready for school.

Assessing children's diverse skills related to the school curriculum, and tailoring teaching and learning opportunities to the variety of understandings, learning styles, and social skills the children in any given class will exhibit requires well-trained teachers. Anything less than this will not serve the educational needs of children who, regardless of the cutoff age for school entry, will vary considerably in their social, emotional, and intellectual skills. We would do much greater service to children if we focused more on making school ready for children than on making children ready for school.

Notes

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[2]Although the age-of-entry varied somewhat among the study's different sites, children's category of young, intermediate, or old would have changed very little if we had grouped based on relative age within each locality.

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