

## **Extending the School Day or School Year: A Systematic Review of Research (1985–2009)**

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*Attention has been directed toward extended school time as a measure to improve academic achievement. The school year and day length have varied over time and across localities depending on the particular needs of the community. Proponents argue that extending time will have learning and non-academic benefits. Opponents suggest increased time is not guaranteed to lead to more effective instruction and suggest other costs. Despite noted limitations in the research, past reviewers have argued that any positive relation between allocated time and achievement is tentative and instructional quality needs to be addressed first. After a comprehensive search of the literature, 15 empirical studies of various designs conducted since 1985 were found. The literature revealed that (a) designs are generally weak for making causal inferences and (b) outcomes other than achievement are scarcely studied. That said, findings suggest that extending school time can be an effective way to support student learning, particularly (a) for students most at risk of school failure and (b) when considerations are made for how time is used. Of note, the strongest research designs produced the most consistent positive results. Implications for policy and practice are discussed.*

**KEYWORDS:** achievement, extended school time, systematic review

Recent attention has once again been directed toward the issue of how much time U.S. students spend in school and its relationship to academic achievement. Adding time to the school year or school day is at the top of the list of measures that have been hypothesized to improve achievement among U.S. students (e.g., C. Brown et al., 2005). Furthermore, comments from U.S. President Barack Obama (“I’m calling for us . . . to rethink the school day to incorporate more time”; March 10, 2009, Speech to the Hispanic Chamber of Commerce) and the Secretary of Education Arne Duncan (“I think the school day is too short, the school week is too short and the school year is too short. . . . You look at all the creative schools that are getting dramatically better results. The common denominator of all of them is they’re spending more time”; April 15, 2009 Interview with Richard Stengal, *TIME*

Magazine) suggest that school time is believed to be a promising strategy among the current administration. As in the past, much of the current concern over the association between time in the classroom and achievement has been fueled by international comparisons showing that students in other industrialized nations have higher achievement test scores than students in the United States (Gonzales et al., 2004) and that students of countries outperforming U.S. students often spend more time in school (Organization for Economic Cooperation and Development [OECD], 2004).

This is not a new assertion from policymakers. In 1983, the influential report “A Nation at Risk,” issued by the federally funded National Commission on Education Excellence, compared the typical U.S. school year of 180 days to the longer school calendars in Europe (190 to 210 days) and Japan (240 days) as justification for more school time. After “A Nation at Risk,” many states considered extending school time. By 1985, about two thirds of states considered adopting measures to change the amount or scheduling of school time (Karweit, 1985), although few measures were enacted. Moreover, in no instance was the length of the school day increased beyond 6.5 hours or the school year beyond 180 days. Rather, legislation appeared in states with unusually short school days or school years and was meant to bring them closer to the national norm (Funkhouser, Humphrey, Panton, & Rosenthal, 1995).

Time in school reemerged as a relevant policy consideration during the 1990s. In 1991, federal legislation established the National Education Commission of Time and Learning to examine the issue of time in America’s schools. The final report produced in 1994, “Prisoners of Time,” reiterated the concern about America’s poor standing in international student achievement comparisons and suggested that little progress had been made since 1983’s “A Nation at Risk” in extending or reforming time use for learning in school.

Continued interest in school time has occurred across the United States not only at the national level but at the state, district, and school levels as well. The Center for American Progress found that more than 300 initiatives to extend learning time were launched between 1991 and 2007 in high-poverty and high-minority schools in 30 states. The Education Commission of the States found more than 50 extended day efforts occurred at the state level between 2000 and 2008 (Gewertz, 2008). In 2005, Minnesota’s school administrators proposed increasing the school year from 175 to 200 days (Lenfestey, 2006). In Delaware, Vision 2015, a coalition of business, education, and community leaders, proposed transforming the school system by adding 140 instructional hours through extending either the school year or the school day (Kepner, 2007). Recently, Ohio’s governor proposed adding 20 days to Ohio’s school year. Although Ohio lawmakers decided against including the plan in the state budget finalized in June 2009, they continue to review the idea (Associated Press, 2009).

Some districts and individual schools have already implemented longer years or extended school days:

- Massachusetts experimented with a longer school day with 10 schools as a pilot project (Kocian, 2009). The Expanded Learning Time Initiative was developed by a group known as Massachusetts 2020 and was prompted by analyses that suggested that the state’s top-performing urban high schools had longer school days. The 3-year-old program showed

some benefits, including higher test scores. However, funding problems threaten its continuation (Kocian, 2009).

- Miami-Dade County, Florida, administrators implemented a 3-year program in 39 underperforming public schools that included an extended school day and a longer school year. However, a final evaluation of the program released in May 2009 suggested the program produced mixed academic results (Durando, 2009).
- Louisiana's recovery school district superintendent, Paul Vallas, recently added 40 days of instruction to the school calendar after Hurricane Katrina (Durando, 2009).
- The Knowledge Is Power Program (KIPP), a group of charter schools serving students in 5th through 8th grades, extends both the school day and year. At KIPP schools, the school day typically begins at 7:30 a.m. and ends at 5 p.m. In addition, half-day classes are held on Saturdays, and students attend a summer session of 2 to 4 weeks. Gaston (North Carolina) College Preparatory (GCP) school provides one successful example of a KIPP school. GCP serves primarily minority and disadvantaged students and was recognized as the sixth highest performing school in the state during the 2002–2003 school year (C. Brown et al., 2005).
- One public charter school, Robert Treat Academy, in Newark, New Jersey, operates 205 to 210 days a year. This school attained the highest test scores among New Jersey urban public schools in 2008 (Durando, 2009).

After years of debate among educators, policymakers, and researchers and numerous natural tests in which schools have extended time and observed later outcomes, there is still little consensus regarding (a) the relationship between the length of school days and years and academic achievement or (b) whether lengthening the school day or year is an effective intervention for enhancing student achievement. In this article, we examine the research evidence on the role of the length of the school day and school year in academic achievement. We also look at the role of the length of the school day and school year on nonachievement outcomes as well as the attitudes of students, parents, and educators toward extending the school day or year. Before turning to the research, however, we first present a brief history of the school calendar and public opinion about extended school time in the United States. We also provide a catalog of both the potential positive and negative effects that the proponents and opponents of extending the school day or year have offered in both the research and policy literatures. Then, we present the conclusions about the extended school day and year that others have drawn from examining the research literature. This is followed by a summary of recent empirical research examining the relationship between the length of the school day or school year and academic achievement and achievement-related outcomes or the effects of extended school days or years compared to traditional calendars. Finally, we present the policy implications of the research.

### **Defining Types of School Time**

The research on extending the school day (ED) or extending the school year (EY) is complicated because researchers talk about school time in different ways.

However, we follow the lead of previous reviewers (Aronson, Zimmerman, & Carlos, 1999; Cotton, 1989; Karweit, 1985; Silva, 2007) in specifying five different types of learning time. *Allocated school time* refers to the number of school days in the year or number of hours students are required to attend school. Allocated school time can be narrowed to *allocated class time*, that is, the time that students are required to be in class. Allocated class time can be broken down into *instructional time*, or the time devoted to instruction, and *noninstructional time*, in which students spend time in the classroom not engaged in instruction. This includes time devoted to organizational or administrative activities, classroom management, and discipline. Instructional time can be narrowed to *engaged time* (also called *time on task*), in which students are paying attention to a learning task and attempting to learn. This excludes time spent socializing and daydreaming. Finally, the time in which students are actively engaged in and experience learning is referred to as *academic learning time*.

Though indirect in its effect, allocated school time is the variable of interest when asking whether ED or EY will affect student achievement. That is, allocated school time is thought to have an impact on academic achievement because it provides an opportunity for increased engaged time and academic learning time. It is important to note that although these distinctions in time are related to academic achievement (maybe even more so than allocated school time), in our synthesis of recent empirical research we are focusing on the allocated school time variable.

### **A Brief History of the School Calendar in the United States**

In the early years of formal schooling in America, school calendars varied across localities depending on the particular needs of the community (Gold, 2002). In agricultural areas it was not unusual for children to attend school for only 5 or 6 months so they could assist with family farm work. Long summer breaks and calendars that released children from school in spring, to help with planting, and in fall, to help with the harvest, were common among rural communities. During the same era, urban schools had much longer calendars, often operating on 11- or 12-month schedules. In 1840, schools in Buffalo, Detroit, and Philadelphia operated between 251 and 260 days a year, and schools were open nearly year-round in New York City, with just a 2-week break in August (Johnson & Spradlin, 2007; Weiss & Brown, 2003).

The school calendar continued to change throughout the 20th century as rural schools added more days and urban schools created a longer summer break. The general increase in family mobility created a need for curriculums to be standardized by grade level and for standardized amounts of time that children spent in school. Parents and educators needed to know that children of roughly the same age would be expected to know roughly the same material when they moved from one locality to another. Emerging elite families in urban areas encouraged a longer summer break, seeking escape from the oppressive heat of the city (Silva, 2007).

By 1900, rural schools had increased their calendar to around 140 days, whereas urban schools had decreased their calendar to 195 days per year, although many students attended far fewer days. Many youth needed to participate in the workforce, and there were few compulsory attendance laws (Tyack & Cuban, 1995). The 9-month calendar, with schools closed during summer, emerged as the norm

when 85% of Americans were involved in agriculture and when climate control in school buildings was limited.

Still, extended school years and school days could be found after the turn of the century. In the early 1900s, summer schools were designed as acceleration programs to reduce the number of years a student attended school. With World War II, extended day schools came into being to provide care for the school-aged children of women who needed to work (Silva, 2007).

By the 1960s, the present school schedule of 170 to 180 days, 5 days a week, 6.5 hours a day became the norm in most school systems (Silva, 2007). According to a report from the Education Commission of the States (Zaleski & Colasanti, 2008), the majority of states set the school year at 180 days (29 states, plus the District of Columbia), 11 states set the minimum number of instructional days between 160 and 179 days, and 2 states set the minimum at more than 180 days (Kansas and Ohio). Also, 8 states plus the U.S. Virgin Islands currently do not set a minimum number of instructional days. For 8 of those 9 states or U.S. territories, the school year is instead measured in numbers of hours.

### **Attitudes Toward Extended School Time**

Parents and teachers have a history of divided opinion on the notion of extending school hours. Even following the launching of Sputnik and during increasing pressure for U.S. students to be internationally competitive, a 1959 Gallup poll suggested that 67% of the public opposed increasing the number of school days for high school students. More recent opinion polls show the public is almost evenly divided about extending school time, with 48% in favor and 49% opposed (Rose & Gallup, 2006). Today, the strongest opposition to extending school comes from middle-class and affluent parents who value the summer vacation for their children and question the value of additional school time (Silva, 2007). Opposition also comes from industries, including transportation, child care, food service, and tourism, whose profitability depends on the long summer break and afternoon hours during which students are free.

In general, teachers and school administrators also fail to emphatically support initiatives to increase school time. A study conducted by the Educational Research Service (1984) with the American Association of School Administrators found that about 56% of a national sample of superintendents felt the current school year provided enough time and 64% felt the current school day provided enough time. A poll by Phi Delta Kappa in 1989 found that most teachers (63%) opposed a lengthening of the school year even if salaries were raised accordingly (Elam, 1989). More recent research on teachers' attitudes revealed less opposition. For example, qualitative research revealed that teachers in California were happy with the additional pay and planning time that extended school time provided (Gandara, 2000).

### **Arguments for and Against Lengthening the School Day or School Year**

The arguments that proponents and opponents have made regarding extending school time are summarized in Table 1. The most prominent argument for increasing the number of days in the school year or lengthening the school day is its potential to increase the amount learned by students. Proponents of ED and EY argue that additional time is expected to promote learning and achievement via increased time on task, broader and deeper coverage of curriculum, more

**TABLE 1***Potential positive and negative effects of extended school time*


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Potential positive effects for students
Increased learning and better academic achievement
More time for learning
More repetition of material; deeper coverage of curriculum
More time on task
More opportunities for experiential learning
Deepened adult–child relationships
Potential negative effects for students
Wasted time (allocated time does not necessarily translate to increased instruction)
Increased fatigue and boredom and decreased effort
Increased absenteeism and drop-out rates
Less time for informal learning, extracurricular activities, student employment, and free time
Potential positive effects for educators, instruction, and teaching
More time for instruction—less hurried pace for covering material
Potential negative effects for educators, instruction, and teaching
Greater number of work hours and less time off
Teacher and administrator burnout
Potential positive effects for parents
Lower child care costs
Easier scheduling and transportation for working parents
Potential negative effects for parents
Child care needs of working parents still may not be met
May interfere with family summer vacations and other family time
Potential positive effects for society
Levels the playing field for disadvantaged children
More learning opportunities for low-income children
Decreased cost because of reduced need for retention, remediation, and other social programs
Increased future productivity
Increased earnings
Reduced crime
Potential negative effects for society
Cost (salaries, facilities, maintenance)
Takes resources from more effective interventions (e.g., addressing instructional quality)

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opportunities for experiential learning, and deepened adult–child relationships (Farbman & Kaplan, 2005). Proponents of ED and EY point to international comparisons. They often refer to data from the 2003 Trends in International Mathematics and Science Study (TIMSS) or data from the OECD Programme for International Student Assessment (PISA). These studies showed that U.S. students scored lower on various tests in math and/or science and that U.S. schools required fewer instructional hours than a number of other countries, including Japan, Finland, Korea, and the Netherlands. Michael Barrett (1990), a Massachusetts state legislator, declared in 1990 that “each year, American children receive hundreds of hours less schooling than many of their European

or Asian mates, and the resulting harm promises to be cumulative and lasting” (p. 87).

In contrast, skeptics argue that increasing the number of days in the school year or number of hours in the school day will not necessarily translate to increased instructional time and increased time in which students are engaged in learning (Aronson et al., 1999; Karweit, 1985; Levin, 1984; Silva, 2007). In line with this argument, opponents point to research showing a great deal of variability in the relationship between allocated time and instructional and engaged learning time (Denham & Lieberman, 1980; Karweit & Slavin, 1981). Also, skeptics point out that international comparisons are more complex than they might appear. For example, four of five nations that scored below the United States on PISA 2003 also offered more instructional time than the United States (OECD, 2004). Likewise, some researchers examining the effects of time in countries participating in both PISA and TIMSS found little relationship between more time and improved scores (Baker, Fabrega, Galindo, & Mishook, 2004). Some researchers suggest that differences in achievement across countries are the result of cultural and societal differences rather than differences in allocated time. For example, Stevenson (1983) suggested that between-nation achievement differences existed at the 1st grade, prior to the possible impact of time allocation differences. Researchers have also suggested that although Chinese children spend 1,500 to 3,000 more hours at school than American children, many of those hours are used for activities other than instruction (Stevenson & Stigler, 1992). In line with American opponents of extended school time, it is also interesting to note that the debate in the European Union has taken the opposite direction. That is, informed by observations that countries such as Germany, Sweden, and Finland delay formal schooling until age 6 or 7 and produce better student achievement results compared to Britain as well as research findings that the practice of allowing children to start school at such an early age may be “stressful,” a recent Cambridge-led comprehensive review argued for delaying the age at which U.K. children begin formal schooling from 5 to 6 (Alexander et al., 2009; Hough, 2008). Finally, some skeptics suggest that without improving the quality of instruction or making more efficient use of time in school, increasing the school day or year would have little or even negative effects on achievement (Funkhouser et al., 1995; Karweit, 1985; Levin, 1984). Levin (1984) stated,

By increasing the “costs” to the student by having to spend more time in what is often an oppressive and uninspiring environment, dropout rates may increase and some students may be turned off to further learning. Additionally, some students may reduce their effort to compensate for the larger time commitment they must make. (p. 3)

On the other hand, proponents also point out a number of possible nonacademic benefits of ED and EY. They argue that the current school schedule is an outdated vestige of the formerly agricultural U.S. economy and that an extended school year provides a closer fit with the lifestyles of today’s American families (C. Brown et al., 2005; Ellis, 1984; Evans & Bechtel, 1998). That is, for many families headed by a single parent or by two parents with out-of-home employment, the long summer vacation and short school day may be less convenient than a longer school year or longer school day. In particular, longer school years and longer school days

may be of particular value for disadvantaged students who may face greater risks in more impoverished communities during nonschool hours (Carnegie Corporation, 1994) and greater summer learning loss (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996) compared to their more advantaged counterparts.

Those skeptical of ED or EY express concern about (a) cost, (b) teacher and student burnout, and (c) reduced opportunities for students to participate in extra-curricular or work activities (Funkhouser et al., 1995; Gewertz, 2008; Karweit, 1985; Mazzarella, 1984). There is a concern that teachers, as well as principals and other school leaders, will be overloaded by longer hours and extra days (Silva, 2007). Furthermore, extended school hours would mean fewer opportunities for students to participate in extracurricular activities (e.g., music lessons, sports, Boy and Girl Scouts, etc.) or to maintain employment after school or during the summer. These too provide valuable learning experiences. Levin (1984) suggested that without increasing incentives, and in particular intrinsic rewards for students to put forth effort to learn, increasing allocated time may actually have negative effects on various academic outcomes. That is, students may be “turned off” to learning by the increased costs in terms of their time and effort. Similarly, other scholars have suggested that increasing school time could result in other undesirable student outcomes, including increased student fatigue and boredom, greater absenteeism, and increased drop-out rates (Rasberry, 1992).

The expenses of staffing, building maintenance and utilities, transportation, additional curricular materials, and/or upgrading or modifying school facilities unsuitable for operating during early or late hours or summer months all contribute to the tremendous cost of extending school time. The recent Massachusetts Expanded Learning Time Initiative increase of school time by 30% in its 1st year required an additional 20% in base funding (Silva, 2007). In the report “Getting Smarter, Becoming Fairer: A Progressive Education Agenda for a Stronger Nation” (C. Brown et al., 2005), the task force called for an investment of \$21 billion annually for expanding and redesigning learning time, with \$7.2 billion necessary to extend the school year in low-performing school districts.

Proponents argue that the high cost of EY or ED would produce desirable financial and social returns over the long term. It would lower expenditures on other social programs and remedial education, increase future productivity and earnings, and/or reduce crime (C. Brown et al., 2005). Opponents counterargue that the cost of extending school time would not be met with commensurate gains in achievement. And other initiatives may be more cost-effective in offsetting future nonacademic costs (Aronson et al., 1999).

### **A Summary of Past Synthesis Findings**

Given the long-standing debate regarding the costs and benefits of extending school time, it is not surprising to find that many scholars have weighed in on the issue. Table 2 presents brief summaries of the conclusions reached by other scholars about the cumulative research on the effects of lengthening the school day or year.<sup>1</sup>

The reviews suggest several areas of consensus and confusion. First, scholars generally agree that there is little good evidence that explicitly tests whether lengthening the school year or the school day leads to academic benefits for



**TABLE 2**

*Summary of conclusions of other reviews of the literature on the effects of an extended school day or year*

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Nickerson (1971)

*Scope:* Qualitative review of alternative school calendar options.

*Evidence:* Described research findings from two school districts.

*Conclusion:* A 210-day schedule in which students completed school a year early provided the best balance between cost and effectiveness in terms of quantity and quality of education compared to various other schedules (traditional 180-day year, a traditional year plus summer school, or year-round schedules). Suggested that when both quantity and quality of time are considered, an extended school year seems to offer the greatest promise.

Fredrick and Walberg (1980)

*Scope:* Qualitative review of relation between time and learning.

*Evidence:* Eleven primary studies addressing the relation between number of school days and academic outcomes.

*Conclusion:* Quantity of school time demonstrated an inconsistent relationship with outcomes. Also suggested that there may be diminishing returns at some point on increasing the time in school, that length of the school year may interact with other important variables, and that as the measure of time is refined to more closely reflect the amount of time devoted to the outcome, the relationship was strengthened.

Caldwell, Huitt, and Graeber (1982)

*Scope:* Qualitative review of the effects of various measures of time.

*Evidence:* Referred to one earlier review (Fredrick & Walberg, 1980) as well as four primary studies addressing relation between length of school year or student attendance and achievement and two primary studies addressing relation between length of the school day and student achievement.

*Conclusion:* Noted that the lack of variation in school year nationwide as a limitation in research. The authors concluded that time seems to be moderately related to student achievement with the relationship becoming stronger as the measure of time reflects what students do in the classroom.

Ellis (1984)

*Scope:* Qualitative review of research on time and achievement.

*Evidence:* Two empirical studies examining the relation between time and achievement.

*Conclusion:* Asserted that only time spent successfully completing instructional activities and not allocated time has been found to have a relationship with achievement.

Concluded that the correlation between allocated time (school day or school year) and achievement is smaller than expected and the costs of extending school time are disproportionate to resulting gains.

Levin (1984)

*Scope:* Theoretical analysis and qualitative review of the relationship between time and achievement.

*Evidence:* Research findings described, including international comparisons, but specific citations to primary research were not provided.

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*(continued)*

**TABLE 2 (continued)**

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*Conclusion:* Asserted that there appears to be consensus in the research that total instructional time in a specific curriculum area positively relates to student achievement in that area and that the proportion of time a student is engaged in academic tasks is positively related to learning. The author concluded that an increase in allocated time alone was not cost-effective and that no good evidence existed to demonstrate that adding days to the school year would improve student performance if other determinants of learning were not accounted for. Highlighted the need for additional research on the topic with various groups of students, grade levels, and academic subjects.

Mazzarella (1984)

*Scope:* Qualitative review of relation between time and achievement.

*Evidence:* Four empirical studies examining the relation between time on task and achievement and several review or theoretical articles.

*Conclusion:* Concluded that spending more time in the classroom might lead to small gains in achievement, particularly for low achievers. Furthermore, extended time may have other social benefits. However, achievement gains were expected to be small and the cost of extended time would be expensive. Highlighted the need for research directly looking at the effects of extended school days or year. Recommended that a more effective approach for enhancing achievement may be to focus on the quality rather than the quantity of instruction.

Quartarola (1984)

*Scope:* Qualitative review of research on time and achievement.

*Evidence:* Eight research studies that examined the relation between the length of the school year or day and achievement.

*Conclusion:* Increasing time in school alone will not automatically increase student achievement or raise standardized test scores because allocated time is not the only variable related to student achievement (i.e., engaged time, instructional quality, teacher feedback are important factors).

Strother (1984)

*Scope:* Qualitative review on the relation between time on task and academic achievement.

*Evidence:* Based on review of time-on-task studies.

*Conclusion:* Suggested that engaged time significantly affects learning, but the results are inconsistent and factors related to the type and quality of the classroom instruction and environment were also likely to play an important role. Therefore, although extending the school year or school day may be a costly option, it may prove to be effective if educators ensure that additional time is used for learning.

Karweit (1985)

*Scope:* Qualitative review of relation between time and achievement.

*Evidence:* Previous reviews of time and achievement as well as two studies examining the relationship between allocated time and engaged time, one study examining cross-national comparisons of school time and achievement, three studies looking at relation between broad measures of the amount of allocated school time and achievement in the United States, and eight studies examining the relationship between engaged time (time on task) and achievement.

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**TABLE 2 (continued)**

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*Conclusion:* The relationship between allocated time and achievement produced mixed findings, and even positive relations were subject to interpretation issues because the mechanism through which greater allocated time had an effect remains unclear. Given the tentative relationship between allocated and engaged time and because time on task in and of itself is not a strong predictor of achievement, the wisdom of enacting policies aimed at school improvement by sheer increases in time was questionable, although few if any negative effects of increased time have been found.

National Education Association (1987)

*Scope:* Qualitative review of time and achievement to evaluate the feasibility of extending the school year or school day.

*Evidence:* Numerous reviews and primary research reports examining the relations between time on task and achievement (including international comparisons) reviewed to evaluate the effectiveness of extending the school year or day.

*Conclusion:* Adding time will be effective in cases where inadequate time was the problem in the first place rather than problems associated with characteristics of the student or of the instruction itself. Recommended that schools ought to focus on more efficient use of existing time and the quality and appropriateness of instruction for students during school time.

Hossler, Stage, and Gallagher (1988)

*Scope:* Qualitative review of relation between increased instructional time and achievement—reviewed several strategies for increasing instructional time, including lengthening the school year or day, improving classroom management, and increasing the quantity of homework.

*Evidence:* Five empirical studies addressing the relation between time in school and achievement as well as previous reviews.

*Conclusion:* Appeared to be a small, positive relationship between number of school days and achievement, although the magnitude of the relationship has varied greatly across studies. However, because the duration of the studies was relatively short, it was difficult to determine the long-term and cumulative effects of extended school time on achievement. Furthermore, there has yet to be a study that examines the length of the school year or school day in a controlled experimental design. The authors could not find any direct evidence examining the relationship between the length of the school day and achievement. They suggested that policymakers should not expect that increased school years or days will inevitably lead to an increase in instructional time and large subsequent achievement gains, as the increase in school time may be used for purposes other than instruction.

Rasberry (1992)

*Scope:* Qualitative review of the relation between extended school year and achievement.

*Evidence:* Previous reviews of the research, opinion articles, school district or task force reports, and one empirical study that examined the relation between total instructional hours and achievement using an international sample.

*Conclusion:* Little research is available to support the proposed benefits of extended calendar and concluded that the high cost of additional school days is disproportionate to any improvement in student achievement, as additional time does not necessarily translate to quality instruction. Also suggested that there may be other disadvantages,

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**TABLE 2 (continued)**

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such as higher drop-out rates, diminished student employment opportunities, less experiential learning time, less teacher development time, and less time for students' personal development. Greater emphasis should be placed on improving time on task rather than lengthening the school year.

Virginia State Department of Education (1992)

*Scope:* Qualitative review of relation between time and achievement in the context of strategies intended to maximize instructional time, including extending the school year, extending the school day, year-round schooling, summer school, and management of existing instructional time.

*Evidence:* Theoretical articles, earlier reviews of the literature, international comparisons, three empirical studies addressing the relation between allocated time and achievement, description of the mixed success of several school districts that extended the school year.

*Conclusion:* Research did not provide sufficient evidence that extending the school year or school day in isolation would result in significant increases in student learning. Rather, increasing the school day may have a number of negative consequences because of increased student fatigue. However, at-risk students and students with disabilities may benefit from an increase in allocated time. Suggested that initiatives that emphasize improving the quality of instruction should be supported.

Funkhouser, Humphrey, Panton, and Rosenthal (1995)

*Scope:* Qualitative review of educational uses of time.

*Evidence:* Earlier reviews and opinion articles; cited numerous research studies to illustrate the inconsistencies in findings regarding the relationship between time and academic achievement.

*Conclusion:* Few outcomes other than achievement have been examined in research looking at the effects of quantity of instructional time. With regard to the effect of extended school year or day in particular, the authors noted that there were no controlled experimental studies examining the direct effect of lengthening the school day or year on achievement. Because no state or district had reformed its school day or year extensively, the relationship between school year or school day length and achievement remained speculative. The authors suggested the enormous expense and public opposition were among the reasons that have prevented districts from extending the school day or year.

Evans and Bechtel (1998)

*Scope:* Qualitative review of the effects of extending school time.

*Evidence:* Theoretical articles, one previous review, and one empirical study examining the relation between allocated time and achievement.

*Conclusion:* Extending the school day or year may bring noninstructional benefits.

However, there was little evidence to support the possibility that achievement would increase as well. Suggested that the crucial issue was how the time is used and, in particular, the quality of instruction.

Aronson, Zimmerman, and Carlos (1999)

*Scope:* Qualitative review of relation between time and achievement.

*Evidence:* Previous reviews, international comparisons of the United States and other developed countries, and descriptions of research findings, but specific citations to primary research were not provided.

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**TABLE 2 (continued)**

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*Conclusion:* There is a lack of rigorous research necessary to support causal conclusions regarding the effect of extending the school day or year and examine the long-term cumulative impact of extended time. There was little or no relationship between allocated time and student achievement because the length of the school day or year says nothing about how that time is devoted to learning activities. Evidence suggested that there was some relationship between engaged time and achievement and there was a larger relationship between academic learning time and achievement. Suggested that efforts should be put toward improving the quality of existing school time.

Silva (2007)

*Scope:* Qualitative review of the relation between extended school time and achievement.

*Evidence:* Previous reviews, opinion articles, international comparisons, one empirical study on relationship between time and achievement, and descriptions of empirical research on related topics (e.g., summer learning loss, relationship between allocated time and engaged time, year-round education, out-of-school time, etc.) and examples of schools that have extended school year or day.

*Conclusion:* Although there was a positive relationship between engaged learning time and achievement, there was little relationship between allocated time and achievement. There have been no experimentally controlled or longitudinal designs that directly assess the effect of extending school time. Extended school time may be particularly beneficial to at-risk or low-income students or students with disabilities. Effectiveness of adding school time depends on how that time is used; although extending time in schools that already have effective curriculum, instruction, and classroom management may result in achievement gains, this may not be the case in schools that struggle in these areas.

Cuban (2008)

*Scope:* Qualitative review of effects of extending school time.

*Evidence:* Research findings discussed, but specific citations to primary research on the relation between allocated time and achievement were not provided.

*Conclusion:* Longitudinal and rigorous research on time in school was lacking, and existing studies were challenged repeatedly for being weakly designed. The author concluded that three reasons—cost, lackluster research, and the importance of conservative social goals to U.S. taxpayers and voters—explained why proposals to alter time in U.S. schools have failed to take hold. Furthermore, what really matters—improving the quality of school time—continued to be ignored.

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students. To examine the question of whether lengthening the school day or school year will have positive effects, scholars have relied on correlational data examining the relationship between various time constructs and achievement. Reviewers have repeatedly suggested that longitudinal and experimental studies in which allocated time is manipulated are needed to draw causal conclusions about the impact of lengthening the school year or school day. Furthermore, reviewers suggest that even the available correlational evidence remains problematic in that little variability in the lengths of the school year and school day exists across districts (e.g., Caldwell, Huit, & Graeber, 1982; Funkhouser et al., 1995; Mazzarella, 1984). Second, although the literature on extended school time suggests

a rich array of potential impacts on children, teachers, and society at large, research has focused almost exclusively on academic achievement.

That said, most past reviewers of the research on extended school time have generally argued that any positive relationship between allocated school time and achievement is tentative at best and that policies designed to increase the school year or the school day are misplaced without first addressing the quality of instruction or the misuse of existing school time. Most scholars argue that the relationship between time and achievement is strengthened as the time variable is refined to more closely reflect the amount of learning time devoted to the achievement outcome. Some reviewers also suggest that the length of the school year may interact with other important variables, such as the student's capacity to learn, the student's effort put into learning, and the quality of the resources for learning (Fredrick & Walberg, 1980; Levin, 1984).

More contested is the claim made by some reviewers that extended time in school may be of particular benefit to at-risk or low-income students or students with special needs (e.g., Mazzarella, 1984; Silva, 2007; Virginia State Department of Education, 1992).

### **The Present Synthesis**

The most extensive review of the empirical literature on extended school time was conducted by Karweit (1985) a quarter century ago. At that time only correlational evidence was available for review and there were no studies in which the effect of lengthening the school year or the school day had been examined in either an experimental or a longitudinal design. Reviewers that followed Karweit (1985) have maintained this claim. However, since Karweit's review of the literature, a comprehensive review has not been conducted of all available empirical work on the school time and achievement relationship and the effects of lengthened school year or day. Consequently, we set out to review the research literature including research conducted in 1985 and after. We undertook the synthesis with hopes of improving in several ways the state of knowledge about the effects of lengthening the school year or the school day. First, this synthesis utilized extensive search procedures to obtain the most comprehensive list possible of empirical studies that examined the effects of lengthening the school day or year beyond a traditional day or year length on achievement. In our search, we also ran across studies that examined the naturally occurring relationship between time in school and achievement. These studies were also included in our synthesis of the literature. Also, to provide some direction for future research, we attempted to look at whether enough evidence had accumulated to draw conclusions about (a) the factors that may moderate when lengthening school time beyond the traditional day or year may be more or less effective and (b) the long-term effects of extended school time. Finally, we examined the literature looking at the relationship between school time and nonachievement outcomes as well as parent and teacher attitudes and reactions toward extended school time. Although we entertained the idea of conducting a meta-analysis of the literature, the heterogeneity in research designs and implementation prevents any meaningful interpretation of the magnitude of effects that would result from such an amalgamation.

## Method of Literature Search and Judging Study Relevance

### *Literature Search Procedures*

Because studies of extended school time are undertaken for different purposes and different audiences, some studies are more likely to be retrieved than others, no matter how thorough the search procedures may be. Furthermore, the possibility exists that retrievable studies have different results from studies that could not be retrieved. The best way to minimize the number of relevant but undiscovered studies is to collect studies from a wide variety of sources and include search strategies meant to uncover both published and unpublished research.

First, we searched six different electronic reference databases for reports related to extended school time: ERIC, PsycINFO, Sociological Abstracts, Dissertation Abstracts, EconLit, and Google Scholar. The searches were conducted through December 2009 and covered all years available in the databases. The terms *extended year*, *lengthened year*, *extended school year*, *extended day*, *lengthened day*, and *extended school day* were used in these searches. Two researchers then examined each title and abstract in the document file and judged whether they felt the document (a) was irrelevant (e.g., the document mentioned extended school time only in passing but was primarily focused on another topic), (b) likely contained relevant background information on extended school time (e.g., an opinion piece or description of a program) but not empirical evidence on its effects, or (c) likely contained empirical evidence on the effects of extended school time. If either researcher felt that the document might contain data relevant to ED or EY, we obtained the full document. Likewise, we attempted to retrieve full documents that appeared to provide relevant background information including news articles, opinion pieces, and program descriptions. In total, 1,390 document records related to extended school year and 818 documents related to extended school day were examined. Of these, 187 extended school year and 160 extended day articles were deemed potentially relevant by at least one document record reader. We then obtained these potentially relevant documents along with numerous documents labeled *background* and examined these in their entirety.

Next, we employed two direct-contact strategies to ensure that we tapped sources that might have access to extended school time research that would not be included in the reference databases. First, we contacted through e-mail 153 deans, associate deans, and chairs of colleges, schools, or departments of education at Research I institutions of higher education and requested that they ask their faculty to share with us any research they had conducted that related to ED or EY. Second, we sent a similar e-mail request to the National Association of Test Directors, the Education Commission of the States, and the regional educational laboratories.

Finally, we examined the references in previous reviews of the extended school time literature to determine whether these mentioned any reports we had not encountered through the reference database and direct-contact searches.

### *Criteria for Including Studies*

Several criteria had to be met for a study to be included in the research synthesis. Most obviously, the study had to have focused on (a) the differences between students attending ED or EY schools and students at traditional day or year schools, (b) a naturally occurring measure of number of school days or hours in the school

day and its relationship to student achievement, or (c) a description of programs that implemented changes in the length of the year or length of the day. For all studies, the relationship between extended school time and any student outcome was included, although measures of achievement were the most frequently assessed outcome. Because we were assessing the state of the literature since Karweit (1985), we included only those studies that appeared in 1985 or after.

In addition, studies had to examine preschool through 12th grade programs based in the United States or Canada. However, we eliminated studies examining the effect of full-day versus half-day kindergarten, as this topic has unique issues that deserve separate attention (for a review of this topic, see Cooper, Allen, Patall, & Dent, 2010). Studies in which the length of the school year was extended for kindergarten students were included.

Because of the limited number of studies addressing the question of extended time, we did not eliminate studies in which the length of school year or school day was confounded with another instructional intervention. Examples of this confounding would be studies in which the report stated that in addition to going to school for more days, extended time students were provided services not available to traditional time students or were instructed using a different curriculum. Below, we make a point to highlight and discuss these potential confounds.<sup>2</sup>

### **Effects of Extended School Years and Days on Achievement and Nonachievement Outcomes**

The literature search located 15 studies that addressed the relationship between extended school time and an achievement-related outcome. Of those 15 studies, 2 assessed the role of ED, 7 assessed the role of EY, 1 assessed both ED and EY separately, 4 assessed combined ED and EY programs, and 1 did not specify the form of extended time. The designs of these studies varied. One study reported just a narrative description of the effects of school time at particular schools. Two studies employed a correlational design using naturally occurring measures of the length of the school year or day length. Two studies were cohort designs in which students from one school year that experienced a lengthened school day or year were compared to students from another school year that experienced a shorter school day or year. Seven studies used a quasiexperimental design, three of which made attempts to match or statistically equate the extended time and the traditional time group. One additional study had both a narrative component based on observations and interviews and a quasiexperimental component with matching of students. Another study employed both a pre–post and quasiexperimental design with matching of students. One study employed a true experimental design with random assignment of students to conditions. Characteristics of all included studies assessing the impact of extended school time on both achievement and nonachievement outcomes can be found in Appendices A, B, and C (these and the appendices referred to below are available online at <http://rer.sagepub.com/supplemental>).

#### *Relationship Between Extended School Day and Achievement*

Adelman, Haslam, and Pringle's (1996) case study of 14 school sites at which various time-related innovations had been implemented highlighted one middle school in Boston that extended the day to 7.5 hours. Adelman and colleagues reported that student outcomes at the Boston school improved dramatically, with



the percentage of students passing the state basic skills test in reading increasing from 77% to 90% over 3 years.

In a correlational study, Wheeler (1987) investigated the link between the length of the school day in 1,030 California schools and reading, writing, and mathematics test performance among 6th grade students, aggregated at the school level. Findings suggested that the length of the school day significantly predicted school-level achievement test scores, with longer days predicting higher scores. There was some indication that a curvilinear relationship existed between the length of the school day and school-level achievement; the positive association between length of the school day and achievement did not hold up at both extremes of the distribution. Also, although reading achievement levels were higher for schools serving higher socioeconomic status (SES) families and with low percentages of families receiving aid, these variables did not relate to the length of the school day, suggesting these SES variables do not explain the relationship between length of school day and achievement.

In additional analyses, the length of the school week (total number of hours over the 5-day week) was positively associated with reading and writing scores for students at low- and high-SES schools and not students at middle-SES schools. Also, there was a positive association between school time and mathematics scores for students at low-SES schools but not for students at middle- and high-SES schools. The relationship between the length of the school week and writing scores was stronger for students at low-SES schools compared to students at high-SES schools.

Bishop, Worner, and Weber (1988) examined the effectiveness of extending the school day to a seven-period schedule in one rural high school in Virginia during the 1985–1986 school year. Student and teacher outcomes were compared for the 1984–1985 (before) and 1985–1986 (after) school years. Results revealed that many students (33% across all grade levels) took advantage of the additional seven-period schedule by enrolling in more courses. No inferential tests were conducted in this study; however, assessments of changes in raw frequencies or average scores were made. The mean grade point average (GPA) across all grade levels appeared to remain unchanged following the implementation of the seven-period schedule. However, positive and negative effects of the lengthened school day in GPA were noted for students who participated in seven periods during the 1985–1986 school year compared to students who took six courses (the maximum) in the 1984–1985 school year. Specifically, for students with seven periods, a decrease in the average GPA of 8th, 9th, and 10th graders was noted, whereas an increase in the GPA of 11th and 12th graders was found. In addition, differences in GPA occurred by subject across all grade levels. Higher GPAs occurred in mathematics, business, music, agriculture, and industrial arts, whereas lower GPAs occurred in language arts, science, foreign language, physical education, distributive education, art, and home economics. There was a neutral effect in social studies. The authors speculated that the drop in GPAs occurred most frequently in subjects in which the greatest increase in enrollment was experienced. The overall failure rate increased from 5.4% to 5.7% of students. However, it is important to note in evaluating these results that findings are confounded with the fact that students in the 1985–1986 seven-period school schedule were taking additional courses, that is, they were required to learn new material in an additional subject rather than receiving

additional instruction in the same subjects. Consequently, it becomes difficult to evaluate the significance of this study's findings. Certainly, having to master material in more subjects could have had positive effects on students' breadth of knowledge but may have made it difficult to improve or maintain previous GPA levels, as might have happened had each class period been extended in time but no seventh period been added. For this same reason, there would be little reason to expect that the GPA in any particular subject would have improved, as students were not receiving any additional instruction in any particular subject and had less time per subject to study outside of school. They were receiving additional instruction in an additional subject.

#### *Relationship Between Extended School Year and Achievement*

Adelman et al.'s (1996) case study of 14 schools at which various time-related innovations had been implemented also highlighted two elementary schools in New Orleans that had extended the school year to 220 days. Adelman and colleagues reported that student outcomes at the two New Orleans schools remained poor. The authors attributed the poor outcomes of the New Orleans schools to poor program planning and management.

Sims (2008) examined the relationship between the length of the school year and student achievement using data from Wisconsin schools before and after a law requiring schools to start after September 1. Results indicated that increasing school time led to a small but statistically significant increase in district scores on the Wisconsin Knowledge and Concepts Examination (WKCE) in 4th, 8th, and 10th grade mathematics. However, increasing school time did not lead to any significant change in WKCE language arts or reading district scores. In addition, separate analyses suggested that a longer school year may more strongly relate to math achievement in rural districts, districts with a higher percentage of minority students, and districts with greater financial resources.

Pittman, Cox, and Burchfiel (1986) examined the effect of the number of school days on academic achievement. During the 1976–1977 school year in western North Carolina, students missed approximate 10 to 20 days of school because of inclement weather. To examine the effect of school year, standardized achievement test scores of 4th through 8th grade students during the 1976–1977 school year were compared to the scores of students from other school years. Across a number of analyses and two school systems, the authors found no uniform trend from one year to the next regarding students' scores on the Iowa Test of Basic Skills.

M. Brown (1998) examined the impact of extending the year by 5 weeks for kindergarteners who were academically at risk. All students in the study scored less than 60% on the Metropolitan Readiness Test (MRT) prereading scores and had attended a full year of kindergarten. Students in the experimental and control group were matched on MRT scores, sex, and ethnicity. Students in the experimental group were invited to participate in the extended time intervention based on the readiness scores and teacher recommendation. Parent participation in the form of asking students about their day in the program was expected as part of the intervention. In a pre–post design looking at just the students who participated in the EY intervention, findings suggested that students in the program demonstrated significant improvement on a teacher-designed assessment of reading and mathematics at the end of the 5 weeks. Furthermore, findings suggested that although all

students improved, females and African American students demonstrated greater improvement compared to males and Caucasian students. Students in the intervention group were also compared on report card grades to students who did not receive the intervention. However, during the first two quarters of 1st grade, findings suggested that the experimental group did not show significantly greater teacher-reported academic progress compared to control students.

Frazier and Morrison (1998) examined the influence of additional school days on academic skills. Kindergarten students in an EY program (210-day school year) at one school were compared to students in four magnet traditional-year schools (180-day school year). The academic domains examined were mathematics, reading, general knowledge, and vocabulary. Students were matched on background characteristics, including IQ, school entrance age, gender, race, parents' education, occupational status, and age, among others, as well as school attendance. Classrooms in the two programs were not found to differ in terms of the environment as measured by the Early Childhood Environment Rating Scale (ECERS; Harms & Clifford, 1980). Findings indicated that EY students significantly outperformed traditional-year students on both the General Information and Reading Recognition subscales of the Peabody Individual Achievement Test at spring of the kindergarten year and fall of 1st grade as well as on the Mathematics subscale at fall of 1st grade. There were no differences between EY and traditional students on the Peabody Picture Vocabulary Test.

Green (1998) examined the effect of an EY school program in Detroit, Michigan, public elementary, middle, and high schools that added 15 days to the school year for 3 consecutive years. Findings suggested that elementary school students at schools with EY made greater improvements in reading, math, and science achievement on the Metropolitan Achievement Test over the 3 years compared to traditional-year students. Likewise, 4th grade students at EY compared to traditional-year schools experienced modest gains in reading achievement on the Michigan Educational Assessment Program (MEAP) test, whereas traditional-year students experienced a loss. There was also a greater percentage of 4th grade students at EY compared to traditional-year schools achieved a satisfactory performance on the MEAP reading test. Middle school and high school students in both EY and non-EY control schools experienced losses in reading, math, and science achievement on the Metropolitan Achievement Test. Green found that a lower percentage of 7th grade students at EY compared to traditional-year schools achieved a satisfactory score on the MEAP reading test. However, 7th graders at EY schools demonstrated greater gains in reading compared to 7th graders at non-EY control schools. There was little difference between students at EY and control schools on the MEAP math test in either 4th or 7th grade.

Using publically accessible data from the Missouri Department of Education, Meier (2009) compared the achievement of students attending four EY elementary schools to students attending traditional-year schools in the same district. In addition to an EY calendar, these four schools also had specific teacher selection, extended professional development for teachers, and research-based programs on student academic achievement. This special version of an extended school year was referred to as *extended plus*. The district implemented this extended plus program at these four elementary schools because of extremely low test scores in these schools and a lack of progress toward improvement. The effect of this extended plus program was assessed using the Communication Arts Missouri

Assessment Program (MAP) test that students take during the 3rd grade and the Mathematics MAP test taken during the 4th grade. Findings indicated that the extended plus program had a significant impact on 3rd grade student achievement only during the last (2005) of 5 years of the study on the Communication Arts MAP test. There was no impact of the extended plus program on the 4th grade Mathematics MAP test for all 5 years (2001–2005) or on the 3rd grade Communication Arts MAP test for the other 4 (2001–2004) of the 5 years. It should be noted that this study does not provide an entirely fair test of the effects of EY for two reasons. First, the reason for students being in the extended plus program was their extremely low test scores. No adjustments were made to account for the analyses. Consequently, the failure to find an effect of EY may be the result of the fact that students at the EY schools started with lower achievement scores compared to students at the traditional-year schools. Second, components in addition to extended year were included in this intervention. Consequently, it is difficult to determine which of these components or combination of components may have caused observed effects.

Also using publically accessible data from the Missouri Department of Education, van der Graaf (2008) compared the achievement of students attending one EY elementary school to students attending one traditional-year school in the same district. Findings indicated that 3rd grade students at the EY school had significantly higher scores on the Communication Arts MAP test compared to students at the traditional-year school in 2002 and 2005. In addition, EY students outperformed traditional calendar year students on the Science MAP test in 2002 and 2003. There were no significant differences between EY and traditional-year students on the Communication Arts MAP test in 2003, 2004, or 2006 or on the Science MAP test in 2004 or 2005. However, as with Meier (2009) it is important to note the limitations that this study utilized an EY school in which students started out with lower test scores compared to the control group and utilized an intervention that manipulated components in addition to extending the school year. Given the sample constraint, it is even more impressive that the EY school outperformed the traditional-year school.

*Relationship Between Combined Extended Day and Extended Year  
and Achievement Outcomes*

Four studies examined the effects of an extended time program in which both the day and the year were extended. In a research report produced by Massachusetts 2020, Farbman and Kaplan (2005) examined eight schools that had extended the school days and/or years. All schools included in the study (a) required that enrolled students attend school for at least 15% more hours than students at schools in the district with a conventional schedule, (b) served a majority of students who qualified for free or reduced-price lunch, (c) were located in a city with a population greater than 50,000, (d) incorporated unique approaches to using additional time, and (e) showed positive learning outcomes. Researchers conducted a 1- or 2-day site visit at each school. The visit included class observations, interviews, and focus groups with administrators, teachers, students, and parents. The authors highlighted that classroom observations and interviews with school leaders and teachers suggested that additional time promoted learning and achievement via increased time on task, broader and deeper coverage of the curriculum, more

opportunities for experiential learning, greater ability to work with diverse ability levels simultaneously, and deepened adult–child relationships.

Also in this research report produced by Massachusetts 2020, Farbman and Kaplan (2005) reported on comparisons between the eight schools that had ED and/or EY and other schools in the district. Findings revealed that students at the profiled schools outperformed students of similar SES at traditional-year public schools. For all Massachusetts schools profiled in this report, the percentage of free and reduced-price lunch students achieving proficiency on the Massachusetts Comprehensive Assessment System statewide standardized end-of-grade tests was higher in extended time schools compared to the percentage of free and reduced-price lunch students achieving proficiency throughout the rest of that school's district.

Farbman and Kaplan (2005) also examined one New York City middle school in which the KIPP was being used. Students performed better on CTB standardized math and reading scores compared to other Bronx and New York City public schools. The authors highlighted that extended time alone may not be the cause of improved academic performance. All schools also made efforts to promote teacher quality, strong leadership, rigorous and continuous professional development, a positive school culture, and strong family engagement, which likely also contributed to students' academic performance.

Ross, McDonald, Alberg, and McSparrin-Gallagher (2007) examined the effects of KIPP in an urban middle school during its first year of implementation. In this study, 49 KIPP students were individually matched to highly comparable traditional-year students of the same ethnicity, SES, gender, and ability who attended different district schools in the same neighborhood. Findings suggested that KIPP students outperformed traditional-year students on the Math and Reading subtests of the norm-referenced portion of the Tennessee Comprehensive Assessment Program Achievement Test (NRT-TCAP/AT) and the Math and Reading subtests of the criterion-referenced test portion of the same test. However, there was no difference between students on the Language Arts or Writing subtests of the NRT-TCAP/AT. In addition, there was a greater percentage of KIPP students compared to traditional-year students who reached a proficient level on the Reading and Mathematics subtests. However, it should be noted that because a number of reforms were made in conjunction to extended school time, it remains impossible to determine if the observed effects are because of the extra school time or another component of the program.

McDonald, Ross, Abney, and Zoblotsky (2008) examined the effects of KIPP in the same urban middle school as Ross and colleagues (2007) during its 4th year of existence. In this study, 165 KIPP students were compared to a student-level matched control group on academic achievement in a quasiexperimental design. The potential comparison group pool was selected from students at schools that were highly comparable to KIPP and to each other in both student and school demographics. Each KIPP student was matched with a comparison student based on criteria including grade level, race, gender, SES, and pretest scores in reading and mathematics. Findings suggested that KIPP 5th grade students outscored control 5th graders on the Math subtest of the TCAP/AT but not the Reading subtest. Likewise, a greater number of KIPP 5th graders compared to control 5th graders achieved a proficient level on the Math subtest of the TCAP/AT. In addition, a

significantly greater number of KIPP 8th grade students compared to control 8th graders achieved a proficient level on the Reading subtest of the TCAP/AT. There were no other statistically significant differences between KIPP students and control students at any other grade levels. Like the previous assessment conducted by Ross and colleagues (2007), again, it is impossible to determine if the observed effects are because of the extra school time or another component of this multi-component program.

Robin (2005) examined the achievement effects of an ED and EY public preschool program in New Jersey. Students were randomly assigned to attend the extended time program through a lottery. Preschoolers attending the extended time program were compared to preschoolers in the lottery who were not selected to attend the program and subsequently attended alternative programs (e.g., half-day programs, care at home, or private full-day program). The extended time program was 8 hours a day and 45 weeks long compared to 3.5 hours and 41 weeks in traditional programs in the same district. Findings suggested that students in the extended time preschool program performed significantly better on the Peabody Picture Vocabulary Test as well as the Picture Vocabulary and Applied Problems subtests of the Woodcock–Johnson Psycho-Educational Battery–Revised (WJ-R) during the fall of preschool, spring of preschool, fall of kindergarten, spring of kindergarten, and spring of 1st grade. The treatment group also performed significantly better on the Passage Comprehension subtest of the WJ-R during the spring of 1st grade, better on the Calculation subtest of the WJ-R during both the spring of kindergarten and the spring of 1st grade, and better on the Letter-Word Identification subtest of the WJ-R during the spring of preschool and the fall of kindergarten. In growth curve analyses, authors reported that students who attended the extended time program showed a significantly accelerated rate of growth on the Peabody Picture Vocabulary Test and the Applied Problems, Passage Comprehension, and Calculation subtests of the WJ-R compared to control students. Quality ratings of the classrooms using the ECERS suggested there were no differences between lengthened and traditional classrooms, suggesting that the enhanced achievement of extended time preschoolers could not be accounted for by the quality of the program.

*Relationship Between Nonspecified Extended Time  
and Achievement Outcomes*

A study conducted by the Division of Assessment and Accountability of the New York City Board of Education (2000) assessed whether the reading and mathematics performance of elementary and middle schools under registration review (SURRs) with extended time differed from SURRs without extended time during the 1999–2000 school year. In this report it was not specified how time was extended in some schools, via longer days, a longer year, or both. Findings indicated that there was greater improvement in the percentage of students achieving grade standards and fewer students scoring in the lowest proficiency level in both reading and math in the extended time schools compared to the non–extended time schools. However, additional analyses indicated that the percentage of certified teachers increased in extended time schools and decreased in non–extended time

schools in 1999 and 2000. Furthermore, there was a positive relationship between the percentage of students achieving grade-level standards in both reading and math and the percentage of certified teachers. There was also a negative relationship between the percentage of students scoring at the lowest proficiency level and the percentage of certified teachers. This suggests that the relationship between extended time and academic performance may in part be accounted for by teacher quality.

### *Summary of Extended Time and Achievement Study Findings*

Of the three studies examining the relationship between ED and academic achievement, all found some evidence that ED led to improvements in academic achievement, although rarely was the relationship significant across all grade levels, SES groups, or for all outcomes. Furthermore, one study suggested that the effect of ED on achievement may be particularly pronounced for at-risk students. Wheeler (1987) found the relationship between extended day and achievement was most consistent among low-SES schools.

However, evidence examining the relationship between ED and academic achievement remains weak, being based primarily on correlational data and case studies. The one study in which a treatment group that experienced a longer day was compared to a control group with a shorter day was confounded by the fact that the participating high school students with a longer day were enrolled in more classes rather than spent more time in the same number of classes. It is fair to say that the effect of ED has yet to be fairly tested using well-controlled experimental or quasiexperimental designs from which strong causal implications could be drawn.

Of the eight studies examining the relationship between EY and academic achievement, seven found some evidence of a positive relationship between EY and achievement. As with the studies of extended school day, in no study was the positive effect of extended school year found to be significant across all groups or for all outcomes. The other study found no relationship, that is, it did not seem that EY had a negative effect. Again, there was some evidence that EY may be particularly beneficial for at-risk youth. For example, Sims (2008) found the relationship between the number of school days and mathematics achievement to be stronger for districts with a greater number of minorities compared to a fewer number of minorities. Likewise, both Meier (2009) and van der Graaf (2008) found some evidence of a positive effect for extended-year schools that primarily served at-risk youth compared to traditional-year schools. In a pre–post analysis, M. Brown (1998) found that African American and female students demonstrated the most improvement in an EY program compared to Caucasian and male counterparts. However, Brown failed to find significant differences when comparing EY to non-EY students in the quasiexperimental portion of the study, although at-risk students were targeted in this study as well.

Even though the evidence for the effects of EY is from quasiexperimental designs, the evidence is still relatively weak. In most of the quasiexperimental studies the school was the unit of assignment to extended-year or traditional-year conditions, but the student was often improperly used as the unit of analysis.

Furthermore, in those studies that used the school as the unit by which conditions were assigned, the sample of schools that made up each condition was always small. In addition, in some cases the tests of the effects of EY were unfair or confounded. For example, both Meier (2009) and van der Graaf (2008) compared schools intentionally selected to operate as an EY school because of the low prior achievement among the students to schools in which students did not demonstrate achievement scores as low. Meier also noted that strategies designed to enhance achievement in addition to extended school time were implemented at the targeted schools. The most trustworthy study in terms of design (M. Brown, 1998) was one in which students (rather than schools) were assigned to conditions and participants in the extended-year condition were matched with a participant in the control condition. This study found no difference in the achievement between EY kindergarten students and their traditional-year counterparts.

Five additional studies did not test the relationship between ED versus EY and achievement separately. All found some evidence of a positive relationship between extending school time and academic achievement, three of which targeted at-risk students as their sample (Farbman & Kaplan, 2005; McDonald et al., 2008; Ross et al., 2007). Again, several studies had limitations. Namely, in three studies (Farbman & Kaplan, 2005; McDonald et al., 2008; Ross et al., 2007) extended school time was examined in the context of whole-school reforms in which a number of strategies were implemented to enhance academic outcomes. Consequently, it is difficult to tell whether any observed effects were the result of extended school time or an accompanying strategy. Furthermore, one study conducted by New York City Board of Education (2000) found that results might have been confounded by teacher quality; there was an increase in the percentage of certified teachers in extended time schools and a positive relationship between the percentage of students achieving grade-level standards in both reading and math and the percentage of certified teachers.

It would seem that based on the limited evidence available ED or EY has, at worst, no effect on achievement and, at best, a small relationship with achievement, although the size of the effect remains difficult to determine based on the evidence currently available. Furthermore, it seems that extending school time may be particularly helpful for those students most at risk of failing. Also, although there was a great deal of variability in the effect of extended time across various grade levels, no consistent pattern emerged to suggest that an extended school day or year would be more beneficial for some grade levels compared to others. Likewise, there was variability in the effect of extended time across various achievement outcomes (e.g., standardized tests vs. grades) and subjects (e.g., writing vs. math). However, again, no consistent pattern emerged to suggest that an extended school day or year would be more beneficial for certain outcomes or subjects over others.

### **The Relationship Between Extended School Day or Year and Nonachievement Outcomes**

Just one ED study also assessed the effect of extended school days on various nonachievement outcomes. In addition to assessing the impact of a seven-period schedule on achievement, Bishop and colleagues (1988) also assessed its effect on



nonachievement outcomes. Overall, the authors found a positive effect of the seven-period schedule. That is, the percentage of minor disciplinary and major disciplinary problems, the number of offenses, the number of days served in detention, the number of suspendable offenses, and the number of days in suspension all decreased in the 1985–1986 school year during which the seventh period was added compared to the 1984–1985 school year when there was a shorter school day. Attendance and drop-out rates remained constant across the 2 years. In addition, participation in extracurricular activities increased.

One EY study also assessed the effect of EY on various nonachievement outcomes. Frazier and Morrison (1998) examined the influence of additional school days on psychosocial skills. Kindergarten students in an extended-year program (210-day school year) reported perceiving greater cognitive competence on the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984) during the fall of 1st grade compared to students in four magnet traditional-year schools (180-day school year). There was no difference on the Perceptions of Peer Acceptance, Physical Competence, or Maternal Acceptance subscales of the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children.

Two studies that examined both ED and EY also assessed the effect of extended time on various nonachievement outcomes. Ross and colleagues (2007) examined the effect of extending school time (both the day and the year) in the context of KIPP at one urban middle school on student perceptions of the school climate. Outcomes were assessed during the first year of the program. Overall, findings suggested that the school climate (e.g., collaboration, environment, expectations, instruction, involvement, leadership, and order) was perceived to be more positive compared to the national norm.

Similarly, McDonald and colleagues (2008) examined the effect of extending school time at this KIPP middle school on student perceptions of the school climate and teacher perceptions of the program during its 4th year of operation. Overall, findings suggested that the school climate (e.g., collaboration, environment, expectations, instruction, involvement, leadership, and order) was perceived to be more positive compared to the national norm. In addition, KIPP teachers' overall satisfaction with their school (e.g., satisfaction with resources, focus, outcomes, support, and pedagogy) was greater than the national norm.

### **Attitudes Toward Extended School Time**

Of the 15 studies examining the impact of extended time on achievement, 5 also assessed student, parent, and teacher attitudes toward ED or EY. Characteristics of these studies are reported in Appendix D. Bishop and colleagues (1988) reported that after implementation, student attitudes toward an extended seven-period schedule were mixed across the entire student body of one Virginia high school that implemented the change (46% favorable, 47% unfavorable). In addition, 67% of students said the extended day schedule was more stressful and 70% said it placed additional demands on them. However, more favorable attitudes were expressed among students who were college bound and took advantage of the seventh period by taking an additional class. Of students who participated in the seventh period, 60% opted to make the extended schedule permanent, 73% of

college-bound students reported that the new schedule helped them meet graduation requirements, and 65% reported it helped them meet their scheduling needs better. Similarly, more than half of the teachers reported that the extended schedule helped students meet graduate requirements (66%), was more efficient (53%), should be adopted on a permanent basis (52%), but was more stressful for students (62%). The authors noted the generally neutral to positive attitudes across teachers toward the schedule despite an increased work load.

In addition to examining the impact of an EY program on achievement, Green (1998) reported the attitudes of staff, students, and parents toward the EY program. At the end of the program, 78% of staff felt that the extended school year would result in improved achievement, 88% were supportive of the extended school year program, and 84% were satisfied with the extended school year program. At the end of the program, only 22% of students were happy to be in school extra days, 30% reported enjoying the extra days in school, 12% reported that they would like to have extra days in school the following year, and 65% reported that they believed more time in school would lead to a better education. Of parents, 86% reported that they were pleased that their child was enrolled in the EY program, 85% felt it was helping their child to improve his or her academic skills, 85% indicated that they believe children need more time in school, 78% indicated that they were supportive of EY, and 77% indicated that they would like their child's school to have an EY the following year.

In their case study of eight ED and/or EY schools, Farbman and Kaplan (2005) suggested that focus groups revealed that the students, teachers, and parents at ED schools were highly enthusiastic about the longer school day, although students, parents, and teachers all agreed that the extra time must be productive, organized, and thoughtfully planned.

Ross and colleagues (2007) examined the attitudes of teachers toward the extended school time at one KIPP urban middle school during its 1st year of existence. The authors suggested KIPP teachers were highly supportive of the school's extended hours. McDonald and colleagues (2008) examined the attitudes of parents toward the same KIPP urban middle school during its 4th year of existence. Overall, parents were very positive regarding the KIPP Academy. For example, when the parents were asked if they were pleased that their child attended the school, 100% of the respondents agreed or strongly agreed.

In sum, then, few studies have examined the relationship between extending school time and nonachievement outcomes, making it difficult to draw any conclusions regarding what effect extending school time may have on student conduct, attendance, and psychosocial outcomes. Based on those studies that also reported parent, staff, and student attitudes toward extended school time, it seems that parent and staff attitudes toward extended time may be neutral to positive, although student attitudes may be relatively less positive.

## Discussion

There are several tentative conclusions about the effects of extended school time that seem warranted by the results of this and previous research syntheses. First, *the evidence suggests there may be a neutral to small positive effect of*

*extending school time on achievement, and there is little chance that extended time has a negative effect.* Of the 15 studies examining the relationship between extended school time and academic achievement, 14 found *some* evidence of a positive relationship for at least one of the achievement outcomes, subsample of students, or form of analysis. Even in those cases in which the direction of the effect was negative for individual outcomes or groups, in no case was a statistically significant negative effect on achievement found (although, to be fair, in some cases inferential statistics were not used to evaluate the effects of extended time). Given the varied methods researchers have used to examine the relationship between extended school time and achievement as well as inadequate reporting of the necessary information to calculate effect sizes in some cases, it is difficult to assess the magnitude of the relationship between extending school time and academic achievement.

Second, the evidence suggests that *extended school time might be particularly beneficial for students who are most at risk of failing.* Consistent across several studies examining the relationship between extended school time and achievement was the finding that extended school time appeared to be effective with at-risk students or that more time benefitted minority, low-SES, or low-achievement students the most. This finding is consistent with the research showing that disadvantaged students are the most susceptible to summer learning loss compared to their more advantaged counterparts because of differences in opportunities to practice and learn outside of school (Cooper et al., 1996). Extra time may also be particularly useful for English language learner students, who not only need extra time to learn mathematics, science, social studies, and all other subject-area curricula but also need time to master the English language. It is important that future studies systematically assess the impact of EY and ED for students with various characteristics in well-controlled designs in which causal implications can be drawn.

However, there are also several deficiencies in the evidence database that suggest that these conclusions need to be viewed with caution.

First, *the research designs used to examine the effects of a lengthened school day or school year generally do not permit strong causal inferences.* Only one study (Robin, 2005) employed random assignment of children to extended time versus traditional programs. Among the 11 quasiexperimental and cohort design studies, 5 studies (M. Brown, 1998; Farbman & Kaplan, 2005; Frazier & Morrison, 1998; McDonald et al., 2008; Ross et al., 2007) employed matching of extended time and traditional school time students. The other quasiexperimental studies did not employ any sort of equating procedure, and many studies based conclusions on a comparison of a very small sample of schools of various calendar or school day lengths. The rest of the evidence was based on correlational designs or case studies. Furthermore, many studies examined the effect of extended time across a number of achievement outcomes, subjects, time points, and groups of students with few adjustments made for running multiple tests. It should be noted that it is possible that significant findings were found only by chance in the context of assessing a large number of relations.

With that limitation in mind, it did appear that the effect of extended time may vary depending on the study design. That is, across all studies in which the

presence of additional school time was manipulated, it is worth noting that better designed studies (quasi-experiments with equating and true experiments) produced more consistent and positive results. That is, among the six experimental and quasiexperimental studies with matched control groups, four studies found consistent evidence for a positive effect of extending school time (Farbman & Kaplan, 2005; Frazier & Morrison, 1998; Robin, 2005; Ross et al., 2007), one study found that the effect was positive for some grades and nonexistent for others (McDonald et al., 2008), and one study found no effect (M. Brown, 1998). In contrast, among the cohort and quasiexperimental studies without a matched control group, just one found consistent evidence for a positive effect of extending school time (New York City Board of Education, 2000), four studies found an effect of extended school time only for certain subgroups or certain years of assessment (Bishop et al., 1988; Green, 1998; Meier, 2009; van der Graaf, 2008), and one cohort study found no effect (Pittman et al., 1986). Although the studies may point to some very tentative conclusions about the relative effects of extended school time, more confident conclusions must await multiple evaluations using strong research designs.

Second, *little evidence exists examining the effects of extended school time on nonachievement measures*. EY or ED might have an impact on students' motivation, attitudes toward themselves, school, or coursework, conduct, discipline, attendance, or fatigue, among other student-related outcomes. Furthermore, extended school time is likely to affect whole families in terms of their happiness or quality of living. Finally, extended school time is likely to affect teachers in terms of the quality of teaching they provide, their job satisfaction, or their overall well-being. Although these outcomes have been discussed among the proponents and opponents of extended school time, rarely have any of these outcomes been examined empirically.

In this review, we found just four studies (Bishop et al., 1988; Frazier & Morrison, 1998; McDonald et al., 2008; Ross et al., 2007) that examined nonacademic outcomes. However, because each outcome (disciplinary problems, perceived competence, perceptions of school climate) was examined in only a single study, it is difficult to draw any conclusions about the effect of extended school time on various nonachievement outcomes. However, it is important to note that the absence of evidence about an effect should not be taken as evidence of the absence of an effect. To the extent that various nonachievement outcomes are valued, they should continue to be considered in the extended school time debate. Future research should make efforts to empirically assess the impact of extending school time on various nonachievement outcomes.

Third, *the current evidence does not adequately address how extended school time may affect student outcomes in the long term*. That is, most of the evaluations occurred shortly after the extended time intervention was implemented. Most studies examined the effect of a lengthened school year or day after only a single year of implementation. Although three studies (McDonald et al., 2008; Meier, 2009; van der Graaf, 2008) examined the effects of extended school time over multiple years at the same school sites, the outcomes were examined for different cohorts of students each year rather than the same students over multiple years. It seems

likely that the effect of extending school time may be cumulative, showing additive effects over numerous years of extended school time or after an entire educational career. However, it remains to be seen what the long-term and cumulative effects of extended school time might be.

There seems to be several directions that future research on extended school time could take. Although a number of studies examined the relationship between extended school time and academic achievement for students at various grades and for various subject matters, no consistent trends emerged. However, it seems plausible that extending school time may be most beneficial among older students, for whom having extra time to cover particular subjects more deeply may be particularly useful. Likewise, it seems plausible that the youngest students are the most susceptible to fatigue, boredom, or restlessness as a result of extending school time. Future studies should investigate whether differences in the effect of extended school time exist for students at different levels of schooling and how extra school time should be most effectively used for students at different school levels.

Possibly most influential, the extent to which the day or school year is lengthened may be the most important factor influencing the effectiveness of extending school time. That is, it would seem that the impact of increasing the school year by a single day would be far less than that of increasing the school year by 40 days. Likewise, adding 5 minutes to the school day may have less impact than increasing the school day by 2 hours. The current evidence did not permit conclusions about what amount of time may be optimal. However, correlational evidence (Wheeler, 1987) in which a continuous measure of school day length was associated with academic achievement suggested that there might be a curvilinear relationship in which at some point increasing school time is no longer associated with gains in achievement. In fact, it seems likely that the relationship between extended school time and achievement would function as a sigmoid growth curve. That is, extending school time increases achievement slowly initially, then once some critical amount of time has been added, extending school time increases achievement rapidly. However, at some point this rapid acceleration declines such that increasing school time no longer results in commensurate gains in achievement and may even result in a negative effect on achievement. It is important that future research systematically examine the effect of extending the school year or day to various lengths to identify an optimal amount of time.

So how far have we come in our understanding of extended school time since earlier reviews of the literature? Consistent among previous reviews of the extended school time literature was the notion that there was little good evidence that explicitly tested whether lengthening the school year or the school day leads to academic benefits for students. Reviewers also generally agreed that although the literature on extended school time suggests a rich array of potential impacts on children, teachers, and society at large, research has focused almost exclusively on academic achievement. Unfortunately, both of these conclusions remain true after looking at the most current evidence on extended school time. As noted already several times, stronger research designs are needed to confidently conclude that EY or ED has a causal impact on achievement. Likewise, little evidence exists on outcomes other than achievement.

Furthermore, most past scholars argued that the relationship between allocated school time and achievement is tentative at best and that policies designed to increase the school year or the school day are misplaced without first addressing the quality of instruction or the misuse of existing school time. We would argue that the cumulative evidence, although imperfect, would suggest that there is some positive effect of extending school time on academic achievement. This is likely the case particularly because the strongest research designs (those in which individual differences in students were accounted for) produced the most consistent evidence for a positive effect of extended school time.

However, we would also agree with previous reviewers that how school time is used determines the effect of additional time on achievement. That is, the content and instructional strategies used in school are paramount to the success or failure of extending school time. It is only common sense that if additional school time is not used for instructional activities or if additional instruction is poor in quality, it is unlikely to lead to achievement gains. In fact, if additional time is not used properly and school is experienced as boring or as punishment rather than as an enriching learning environment, it could lead to even undesirable student outcomes, such as student fatigue or low motivation. Going further, we would suggest that instructional practices can be viewed as mediators of extended school time effects on students. That is, the effectiveness of instruction might determine whether extended school time has positive, negative, or no effects on student outcomes. For example, having more time may lead some teachers to spend more time working with students individually, providing opportunities for experiential learning or taking time to integrate new curriculum into what has already been learned or relate it to the real world, whereas other teachers might not take advantage of the additional time. Future research should examine these variations in instructional strategies in the context of extended school time to determine how additional time may be used to best support student outcomes.

We believe that the success of the extended time programs examined in studies reviewed in this synthesis may be because of the fact that teaching quality and classroom environment were often considered in the extended time program implementations. For example, all of the successful schools highlighted as part of the Massachusetts 2020 project (Farbman & Kaplan, 2005) made efforts to promote teacher quality, strong leadership, rigorous and continuous professional development, a positive school culture, and strong family engagement. Several other studies (McDonald et al., 2009; Meier, 2009; Ross et al., 2007), all of which found some evidence of a positive effect, examined the effect of extended school time using schools in which whole-school reforms that included a number of strategies were implemented to support student achievement and other adaptive student outcomes. Furthermore, several studies (Frazier & Morrison, 1998; Robin, 2005) made a point to explicitly assess the quality of the classroom environment in comparing students in extended time to those in traditional time programs. Both studies found no differences in the quality of the classroom environment between the traditional and extended time classroom; however, they both found enhanced achievement for extended time students compared to traditional time students. These findings suggest that all else equal in terms of the quality of instruction and

classroom environment, more time in school is likely to lead to improvements in academic achievement.

### **Implications for Policy and Practice**

There are several implications of these findings for policymakers. First, ED or EY may not on its own universally enhance achievement among students. Rather, extending school time is probably better viewed as one of many interventions needed to alter the academic success of students, particularly those who enter and continue with disadvantages. As has been highlighted by previous reviewers, it is of the utmost importance that effective instructional strategies be used in schools for additional school time to be worth the costs associated with implementing it. Furthermore, it is possible that other support services, such as after-school programs, summer school programs, and other out-of-school services, may provide similar levels of academic support when extended school time is not an option for struggling students.

The concern of opponents of extended time who believe that opportunities for alternative learning experiences during nonschool time are just as important as the learning that occurs during school hours is certainly valid. This concern may be truer for advantaged students who have greater opportunities for enriching learning experiences outside of school hours. Nevertheless, based on those studies that examined student, teacher, and parent attitudes toward extending school time, it seems that staff attitudes toward extended time and parent attitudes, in particular, may be relatively positive, although student attitudes toward extended school time may be less positive. Furthermore, extending school time may be particularly important for single-parent families and families in which both parents work outside the home. This suggests that extended time schools ought to be an option available to families who desire it as well as for teachers who prefer working in an extended school context.

### **Conclusions**

Taken together, the research evidence would suggest that extending school time can be an effective means to support student learning, particularly for students who are most at risk of school failure and when considerations are made for how that time is used. However, the research on extended school time leaves much to be desired. The research designs are weak for making strong causal inferences, and outcomes other than academic achievement have yet to be the focus of study. The strength of the effect of extending school time as well as the long-term and cumulative effects have yet to be determined. Likewise, the optimal amount of additional time that balances costs and benefits needs to be further investigated. Of course the amount of time available is just one of several factors that influences student learning. However, it would seem that alongside other well-designed initiatives to support student learning and development, extending school time may be a powerful tool. The task now falls on education researchers to conduct well-designed research that will help determine under what conditions, for whom, and when more school time will yield the greatest benefits.

## Notes

<sup>1</sup> Excluded from the table are reviews that addressed the relationship between time and achievement but did not specifically discuss the role in promoting achievement of the number of school days or school hours in the day. Also excluded from this discussion are reviews that exclusively focused on other time-related strategies, including modified school calendars, after-school programs, summer school, and extended-year programs for special populations of students.

<sup>2</sup> For cases in which an effect size could be calculated, we used the standardized mean differences (Cohen, 1988) to estimate the effect of extended school time. For this synthesis we subtracted the traditional time mean from the extended time mean and divided by their weighted average standard deviation. Tables describing the studies in the synthesis, including effect sizes when possible, are included in the appendices.

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