

# The Role of Literacy in Building the Economy: Summer Literacy Interventions for Grades 3–5

By Jennifer Merriman Bausmith



**Jennifer Merriman Bausmith** is a senior director at the College Board.

### **Mission Statement**

The College Board's mission is to connect students to college success and opportunity. We are a not-for-profit membership organization committed to excellence and equity in education.

### **The College Board**

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators and schools.

For further information, visit [www.collegeboard.org](http://www.collegeboard.org).

© 2012 The College Board. College Board, Advanced Placement Program, AP, SAT and the acorn logo are registered trademarks of the College Board. PSAT/NMSQT is a registered trademark of the College Board and National Merit Scholarship Corporation. All other products and services may be trademarks of their respective owners. Visit the College Board on the Web: [www.collegeboard.org](http://www.collegeboard.org). Printed in the United States of America.

**For more information on College Board research and data, visit [www.collegeboard.org/research](http://www.collegeboard.org/research).**

RESEARCH

# Contents

Executive Summary ..... 2

Introduction ..... 3

A Developmental Trajectory of Achievement Gaps in Literacy..... 4

The Effect of Summer Vacation on Achievement Gaps ..... 9

Conclusions..... 12

References..... 13

Table

    Table 1. Student High School and College Success by SES Level ..... 11

Figures

    Figure 1. NAEP reading scale scores, 2009 ..... 5

    Figure 2. Mean SAT® scores for critical reading and writing by race/ethnicity, 2010 ..... 5

    Figure 3. NAEP reading scale scores by race/ethnicity in grades 4 and 8..... 6

    Figure 4. Matthew effect: The rich get richer from early literacy experiences ..... 8

    Figure 5. Reading instructional focus ..... 9

## Executive Summary

The need is urgent for reducing literacy achievement gaps — both morally to ensure that all students receive a high-quality education as well as economically to build our nation’s workforce with the requisite skills needed for the 21st century. Taken together, changes to the economy, divergent literacy skill distributions, and changes to the demographic composition of the U.S. population create a perfect storm of factors that will increase social and economic inequalities as well as affect the United States’ ability to be a competitive global leader (Kirsch, Braun, Yamamoto, & Sum, 2007). This report explores how and when literacy achievement gaps develop and argues that effective summer literacy programs for low-achieving students in the middle grades offer promise as a way to reduce those gaps to ensure later academic and economic success.

## Introduction

The 1970s brought an end to a golden age of employment and earnings for workers of all educational groups, especially those without a college degree (Danziger & Ratner, 2010). Since then, the need for young adults to attain postsecondary education in order for them to be financially independent from their parents and also to support their own families has risen dramatically (Danziger & Ratner, 2010). Estimates of lifetime earnings by educational attainment clearly reflect the financial benefits of attaining a college degree; high school dropouts are projected to earn \$1 million, whereas college graduates are projected to earn more than twice that amount at \$2.1 million (U.S. Census Bureau, 2002).

We must also consider the growing need for an educated citizenry in a technological society (Barton, 2002). Over the next 10 years, the bulk of job growth will be in professional, scientific, and technical services (Bureau of Labor Statistics, 2010). Baby boomers currently make up the largest proportion of these technically skilled workers in the U.S. labor force. As those workers retire in the next five to 10 years, there will be a greater need for highly educated citizens to move into the workplace with the technological skills needed to become scientists, engineers, and physicians — professions that also rely heavily on strong literacy skills.

Literacy achievement is critical for both occupational and financial success. Over the past three decades, dramatic changes in economic and technological forces impacted the structure and composition of the U.S. labor market, which in turn impacted the demand for workers across industries and occupations (Sum, Kirsch, & Yamamoto, 2004). “Workers in professional, managerial, high-level sales, and service occupations gained the most from these labor market developments throughout the 1980s and 1990s, while many workers in entry-level office and blue-collar occupations, except construction-related craft workers, have lost ground” (Sum et al., 2004, p. 6). Workers with higher literacy levels were more likely than workers with lower literacy levels to receive additional education and training, thus expanding the proficiency gaps over a lifetime (Sum et al., 2004). These additional trainings also serve to expand differences in earnings.

Using the National Adult Literacy Survey (NALS) and International Adult Literacy Survey (IALS), Sum et al. (2004) examined the relationships between U.S. and international adult literacy levels and employment rates, occupation, earnings, poverty, and job-related education and training. The findings revealed that adults with higher literacy proficiency:

- were more likely to be employed;
- were more likely to hold professional, management-related, and technical occupations;
- earned three times the annual salary;
- were less likely to be poor; and
- were more likely to have participated in on-the-job training in the prior year.

As compared to adults internationally, U.S. adults were in the bottom third of the distribution of literacy skill and had larger literacy proficiency gaps. Interestingly, more than half of workers with low levels of literacy proficiency thought that their current levels of reading, writing, and arithmetic skills were “good” or “excellent” and that their skill levels were not limiting their job opportunities.

In the late 2000s, the global recession put a further strain on labor markets. Demographic analyses of unemployment rates and the incidence of long-term unemployment (those out of work for at least 27 weeks) revealed disproportionate impacts of the 2007–2009 recession across demographic groups (Allegretto & Lynch, 2010). Individuals with less than a high school diploma had unemployment rates that were more than 3.5 times higher than individuals with a bachelor’s degree. Men, blacks, Hispanics, teenagers, and workers in

construction and manufacturing had the highest rates of unemployment. Workers with a bachelor’s degree and workers in management, business, financial, and professional occupations had the lowest unemployment rates.

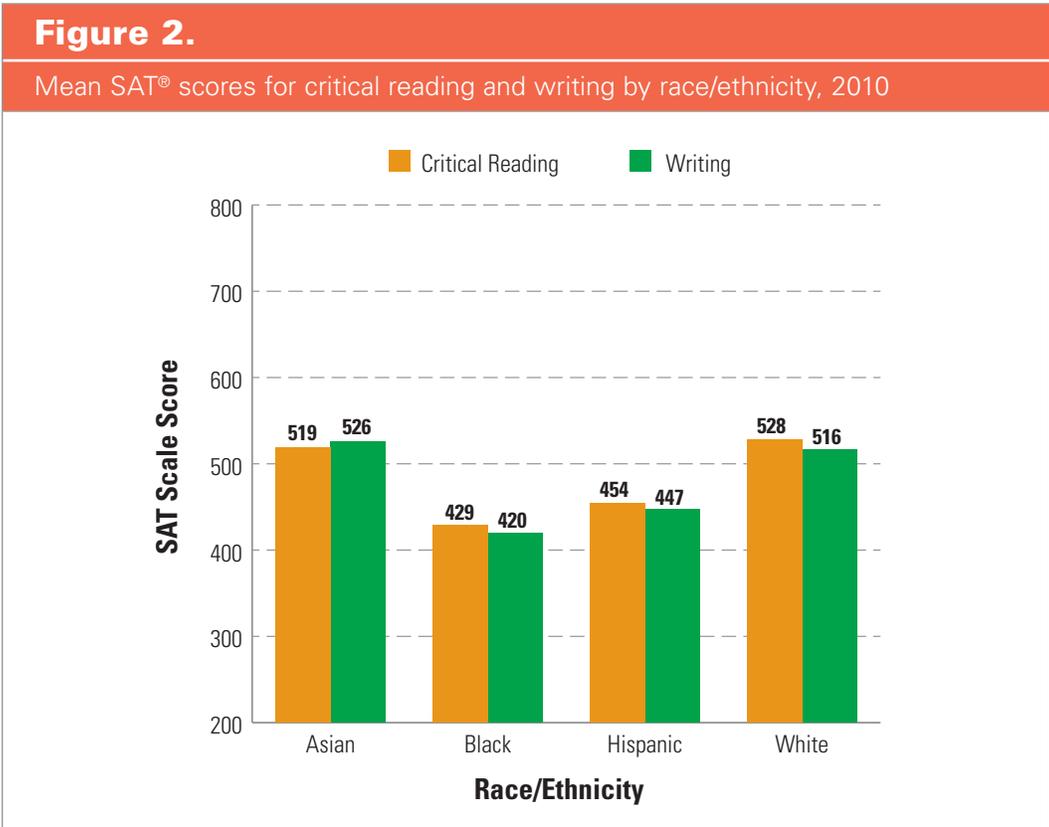
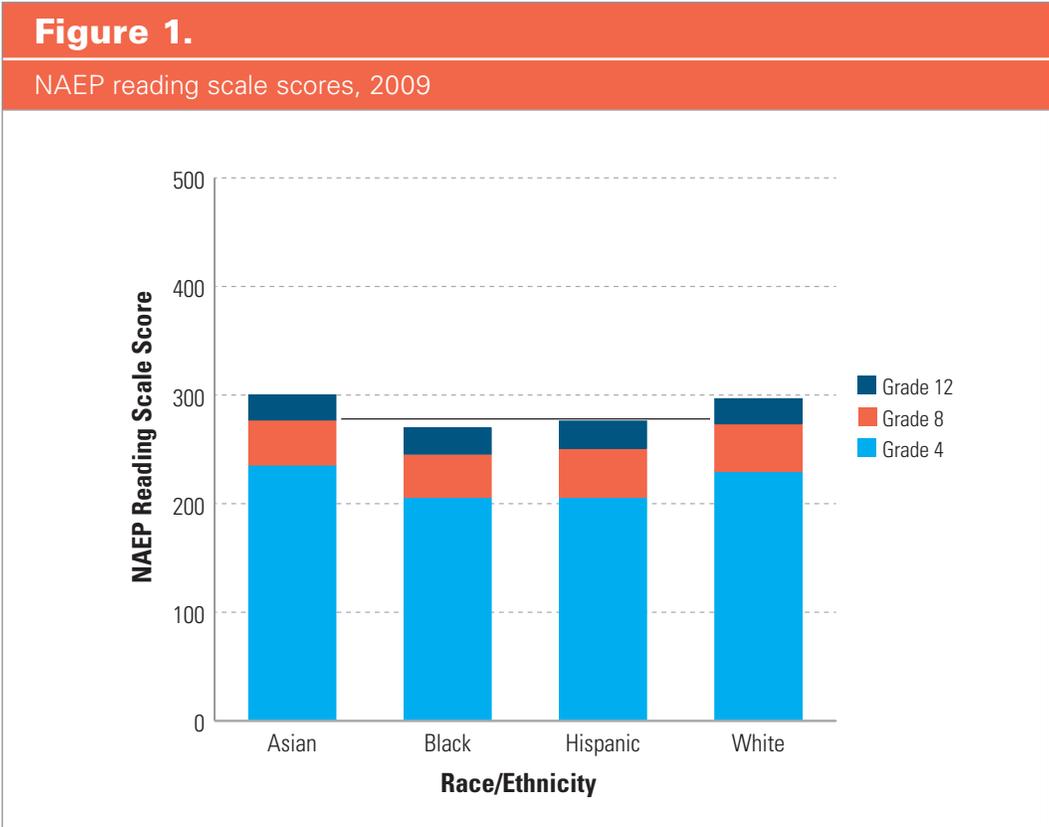
... report is designed to identify critical developmental time frames that could be a target for instruction to address long-standing literacy achievement gaps.

According to U.S. census data, the U.S. population is becoming increasingly diverse, which suggests that these literacy gaps will only worsen over time. Foreign immigration to the U.S. accounts for ever-expanding diversity, with estimates that it will account for more than half of the nation’s population growth from 2000 to 2015 (U.S. Census Bureau). Derived from both higher birthrates and increased immigration, growth in the U.S. Hispanic population is expected to be the largest of all demographic groups (Tienda, 2009).

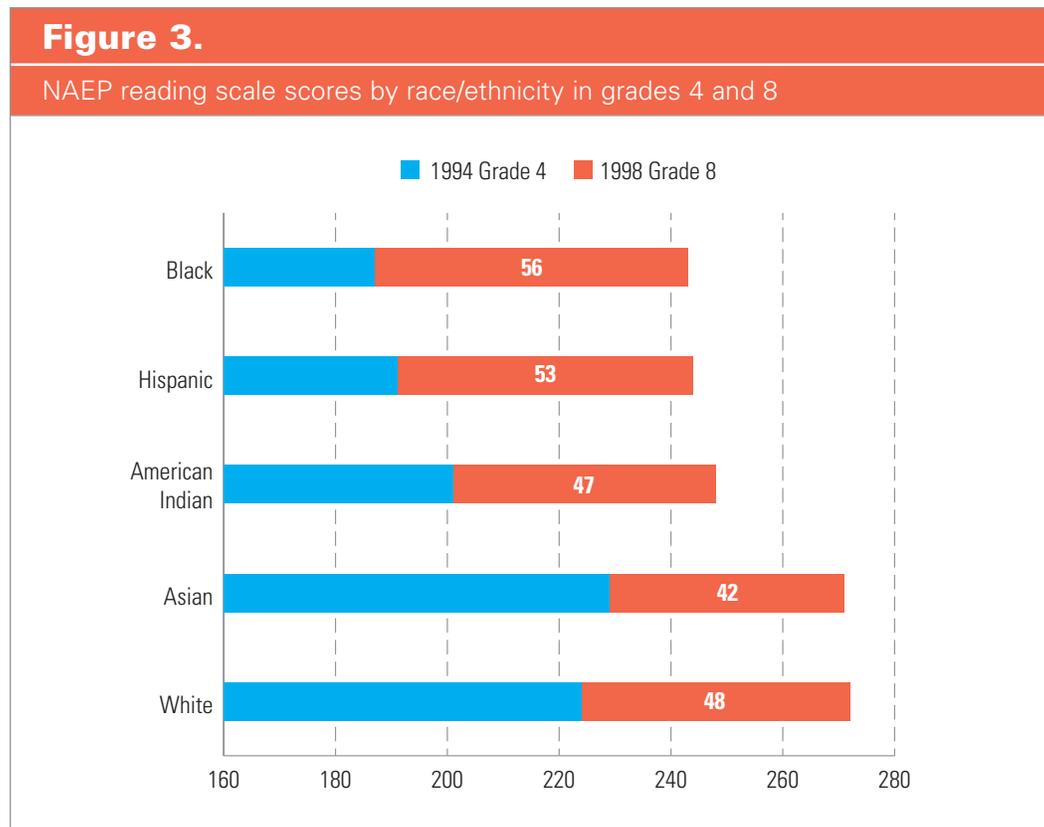
Given the importance of literacy for both individual and national prosperity, this report is designed to identify critical developmental time frames that could be a target for instruction to address long-standing literacy achievement gaps.

## A Developmental Trajectory of Achievement Gaps in Literacy

There is plentiful evidence that the demographic groups that are growing the most also have some of the lowest literacy achievement rates (cf. Tienda, 2009; Lewis, Simon, Uzzell, Horwitz, & Casserly, 2010; Barton & Coley, 2009). For example, Figure 1 presents average scale scores for students by race/ethnicity on the reading portion of the National Assessment of Educational Progress (NAEP) in 2009 (U.S. Department of Education, 2010a; U.S. Department of Education, 2010b). White and Asian students outperformed black and Hispanic students at all grade levels in reading, and white and Asian students in eighth grade had higher scale scores than black and Hispanic students in 12th grade. Similar gaps are seen in Figure 2, which presents SAT® critical reading and writing mean scores for the 2010 college-bound senior cohort by race/ethnicity (The College Board, 2010).



Coley (2003) examined the growth of achievement scores in reading and mathematics among various subgroups developmentally. The results showed that growth in reading scores from fourth grade to eighth grade was greater for blacks and Hispanics than for whites and Asians (see Figure 3). This suggests that, although black and Hispanic students' achievement grew substantially between grades four and eight, significant gaps remained in grade eight because black and Hispanic students were so far behind the achievement of white and Asian students in grade four.



Note: The number in each bar represents the difference in scale score from grades four through eight.

While No Child Left Behind (NCLB) was designed in part to bring about improvements in reducing the achievement gap, state assessments vary in their rigorousness, resulting in uneven expectations for student learning. In some states, the percentage of students scoring proficient on their state assessment is much higher than the percentage of students scoring proficient on the NAEP assessment because the state assessments hold less rigorous standards (Linn, Baker, & Betebenner, 2002). Recent analyses of the impact of NCLB on reading achievement using NAEP data revealed that national average achievement remained flat after NCLB, and achievement gaps were not significantly narrowed (Dee & Jacob, 2009; Lee, 2006).

The achievement gap begins prior to the entrance of formal schooling (Coley, 2002). Using data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Coley found that "being a minority student, a younger student, having parents with less education, and living in a single parent household put a student at risk of school failure" (p. 7). Recent research has demonstrated that socioeconomic status (SES) is a stronger predictor of

achievement than is race/ethnicity. Specifically, when SES is accounted for, disparities in performance across racial/ethnic groups are significantly reduced (e.g., Coley, 2002; Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003).

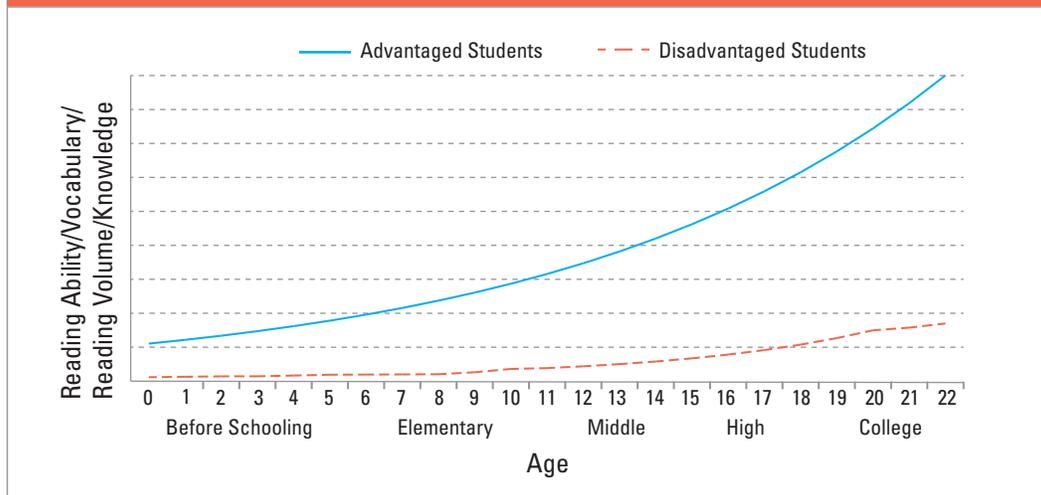
For example, Turkheimer et al. (2003) studied 7-year-old twins using biometric analyses examining genotype, shared environment, and nonshared environment as it interacts with SES. They found that in low-SES families, 60% of the variance in IQ is accounted for by the shared environment and 0% by genes. But in affluent families, the result is almost exactly reversed. This suggests that the early learning experiences of low-income students are critical to their educational outcomes. Because blacks and Hispanics are disproportionately economically disadvantaged compared to whites in the U.S., young children in these racial/ethnic groups frequently have fewer opportunities for high-quality early learning experiences. In addition, economic disadvantages play a significant role in child development and achievement in that these families are often unable to provide the basic needs of nutrition and medical care during both prenatal and early childhood development (Barton, 2003; Rothstein, 2004).

In an extraordinary longitudinal study, Hart and Risley (1995) recorded the spoken interactions between parents and children each month for 2.5 years in 42 families from three different SES levels: professional, working class, and welfare recipients. An analysis of the transcripts revealed both qualitative and quantitative differences in spoken language across the family groups. Overall, children of professional families were exposed to more spoken language than were children of welfare-recipient families, and that language tended to be more affirmative than prohibitive. In a professional family, children heard 11 million words in a year while children in a welfare-recipient family heard just three million. By age 3, the children of professional parents had larger vocabularies than the parents of children in welfare-recipient families. In a follow-up with previously studied children at age 9, the large differences in the amount of children's language experience at age 3 were tightly linked to large differences in their later achievement.

This exponential growth in literacy skill gaps is often referred to as the Matthew effect (Stanovich, 1986). The term was taken from the Gospel according to Matthew: "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (25:29). Students who experience early reading success tend to read more, which further improves reading ability and knowledge, whereas students who experience early reading difficulty tend to read less. By avoiding reading they have less opportunity to learn new words and build knowledge and so on in a reciprocal manner.

**Figure 4.**

Matthew effect: The rich get richer from early literacy experiences



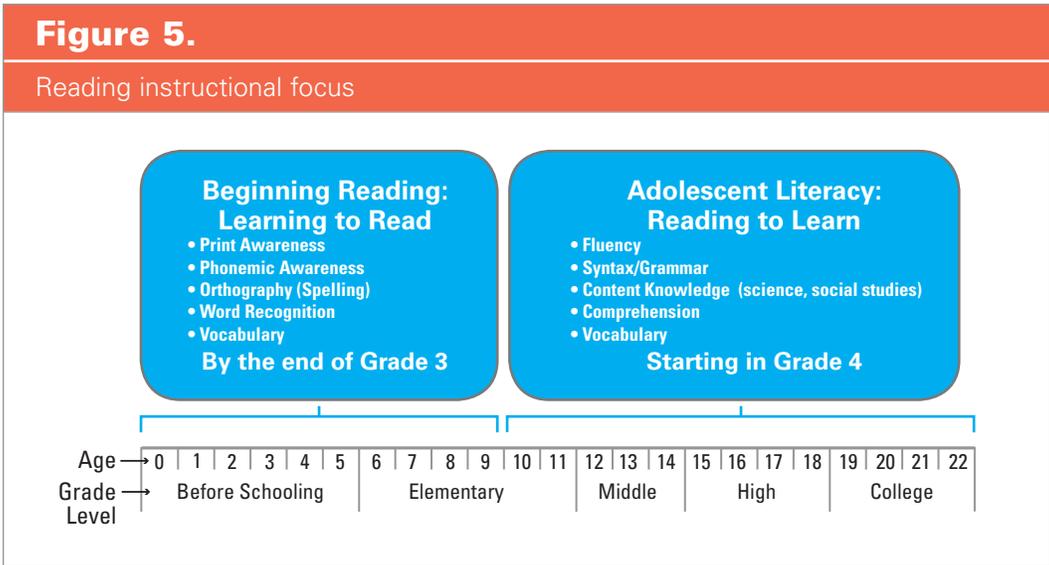
Note: The chart depicts the author's rendering of the concept, not real data.

Estimates of the impact of the Matthew effect (see Figure 4) suggest that “the least motivated children in the middle grades might read 100,000 words a year, while the average children at this level might read 1,000,000. The figure for the voracious middle grade reader might be 10,000,000 or even as high as 50,000,000. If these guesses are anywhere near the mark, there are staggering individual differences in the volume of language experience, and therefore, opportunity to learn new words” (Nagy & Anderson, 1984, p. 328).

Reading development<sup>1</sup> is often discussed in two phases: beginning reading and adolescent to adult reading. The focus of beginning reading is on learning to read, as students learn how to decode letters and words to make meaning out of them. Adolescent and adult reading generally focus on reading to learn, as students read to gain new information on various subjects. In terms of formal school instruction, learning to read is the priority from kindergarten to about the end of third grade. By fourth grade, students are expected to be fluent readers, and the instructional focus quickly transitions to reading more extended text passages to learn new information (e.g., social studies). Figure 5 presents a simplified schematic<sup>2</sup> of the different instructional emphases in reading instruction. Students who are not fluent readers by the time they enter fourth grade and who struggle to construct meaning from text will fall further and further behind, thereby perpetuating the Matthew effect. Thus, this transition in the late elementary to early middle school years is a very critical one for young students (Pritchard & Breneman, 2000).

1. A full review of the research on the development of reading is beyond the scope of this report. See Kamil (2011) for a comprehensive review of the current reading research.

2. Reading is a complex and reciprocal procedure whereby processes occur both in learning to read and reading to learn. For example, fluency is important in both learning to read as well as in reading to learn new information. This schematic is intended to give the readers a broad sense of the general focus of reading instruction developmentally and should not be interpreted as comprising highly distinct phases by grade or age level.



Literacy instruction is important at all ages, though certainly early exposure and instruction afford lasting benefits that are harder to develop later. There is now substantial evidence that high-quality preschool programs — but not average programs — produce large achievement gains for low-income children, and that the returns on investment economically are very high relative to program costs, even for very costly programs (Pianta, Barnett, Burchinal, & Thornburg, 2009). Although universal preschool programming offers an effective way to narrow literacy achievement gaps, until there is sufficient political and economic support to implement such programming, other interventions are needed to support literacy development for students who are lagging.

Thus, this stage in formal schooling, in which the focus of reading instruction changes from learning to read to reading to learn, can be challenging for students who have not had strong early childhood literacy exposure. Research has shown that even when economically disadvantaged students are academically on par with their noneconomically disadvantaged peers through third grade, differences widen as they move into the later elementary school years, often referred to as the “fourth-grade slump” (Chall & Jacobs, 2003; Chall, Jacobs, & Baldwin, 1990; Hirsch, 2003; Rosenshine, 2002). This finding suggests that late elementary school is a time when targeted efforts should be made instructionally to limit the Matthew effect.

## The Effect of Summer Vacation on Achievement Gaps

Critics of NCLB argue that strict accountability measures resulted in a narrowing of the curricula, focusing only on what the test covers in mathematics and language arts (e.g., Forum on Educational Accountability, 2004). In order to provide additional support to students to reduce achievement gaps, instructional time is needed outside the regular school day so that critical content taught in school is not supplanted. Options outside the school day include after-school programs and summer enrichment programs. While after-school programs have often been considered an optimal location for enriched tutorials and instruction to reduce achievement gaps, to date there is little evidence to support lasting, positive impacts on student achievement (Black, Somers, Doolittle, Unterman, & Grossman, 2009; Dynarski et al., 2003; Dynarski et al., 2004; James-Burdumy, Dynarski, Moore, Deke, & Mansfield, 2005).

Summer enrichment programs, however, offer some promise. Cooper, Nye, Charlton, Lindsay, and Greathouse (1996) conducted a comprehensive meta-analysis of the literature on the effects of summer vacation on student achievement. Their review of 39 studies revealed that there is significant loss of student knowledge and skills during the summer vacation months, with conservative estimates placing the loss at about one month's worth of learning. More alarming were the findings that these effects were moderated by family income levels, with middle-class students showing gains on reading and language achievement over the summer but lower-class students showing a loss of reading achievement. "On average, summer vacations created a gap of about three months between middle- and lower-class students" (Cooper et al., 1996, pp. 261–262). These class differences were attributed to differences in opportunity to learn during the summer months because lower-class families were unable to provide the same level of enrichment to their children as were middle-class families.

More recently, Alexander, Entwisle, and Olsen (2007), in a longitudinal study of students from 20 Baltimore public elementary schools, tracked student achievement from first grade to age 22 (through high school and college) across SES levels. The findings revealed that when comparing high- and low-SES student achievement differences in grade nine, high-SES students on average scored 73.2 points above low-SES students on standardized tests. Although about a third of that SES difference can be accounted for by differences prior to starting school (26.5 points), the remainder of that difference was accumulated over the school years, with the largest component (48.5 points, or two-thirds of total difference) stemming from summer learning differences over the elementary years — *not* from differences in learning during the school year. In other words, achievement gaps widen over time in relation to summer learning opportunities. Moreover, these differences at the start of high school in turn predict high school and college success (see Table 1). Over one-third of the low-SES group but just 3% of the high-SES group were high school dropouts. Nearly 60% of the high-SES group attended a four-year college by age 22, while just 7% of the low-SES group did so. Again, summer learning differences account for most of the differences in outcomes.

... there is significant loss of student knowledge and skills during the summer vacation months, with conservative estimates placing the loss at about one month's worth of learning ...

<b>Table 1.</b>		
Student High School and College Success by SES Level		
<b>Socioeconomic Status</b>	<b>High School Dropouts</b>	<b>4-Year College Attendance</b>
Low	33%	7%
High	3%	60%

Source: Alexander, Entwisle, and Olsen, 2007.

Thus, high-quality summer learning programs hold promise as a time to reduce achievement gaps, especially for low-income students. Indeed, Cooper, Charlton, Valentine, and Muhlenbruck (2000), in a separate meta-analysis in 2000, found consistently positive effects of summer programs on students’ reading achievement. Although the effects were stronger for middle-class students than for lower-class students, they attribute this finding to the likelihood that additional home resources positively interact with summer school programs for an added value for middle-class students. To this end, targeting summer literacy programs specifically toward lower-income students may help reduce achievement gaps.

In addition, Cooper et al. (2000) identified summer program features that were associated with positive outcomes for students. These features included:

- Local control of the program for a small number of schools or classes;
- Small-group or individualized instruction that is focused on reading (as opposed to study skills);
- Parental involvement;
- High-implementation fidelity; and
- Required (not voluntary) program attendance, especially for those students with achievement levels that would benefit from additional support.

Certainly the content and duration of a summer literacy program would greatly influence its effectiveness. Simply having students spend time in low-level instructional activities would be insufficient for moving their skills forward. But, with rigorous instruction that is focused on the literacy skills in question, we can hypothesize that this additional summer time instruction could help reduce literacy achievement gaps.

## Conclusions

There are substantive economic advantages for both individuals and the nation to having a highly literate society because more jobs require individuals with strong literacy skills. As the demand for highly skilled workers increases with global demand (Partnership for 21st Century Skills, 2008), individuals with strong literacy skills will be much more likely to have high-paying jobs. Our country is becoming increasingly diverse and literacy achievement gaps persist. Although children often start school with these gaps, the gaps expand over the school years, especially during the summer vacation months, when low-income students lose ground

academically. There is solid evidence that high-quality preschool can ameliorate achievement gaps before children start kindergarten, though widespread high-quality preschool is not yet available to all children. Much research has also been done to determine what high school and middle school courses and behaviors are associated with college access and success (e.g., Wiley, Proctor, & Wyatt, 2010; Wiley, Wyatt, & Camara, 2010), but if students do not come to middle school prepared to enter this pathway, the Matthew effect may persist.

Thus, an opportunity gap exists in the late elementary/early middle grades (grades three to five) for targeted literacy interventions for students who have not developed the fluency required to read text to learn new information. These students need additional time to practice reading not only to build skills, but also to ensure that content knowledge is not lost while fluency improves. Summer programs that target low-income and low-achievement

students and use research-based instructional practices offer promising results in the reduction of literacy skill gaps. Improvement in literacy achievement in the middle grades will in turn improve academic performance through high school and college. These achievement improvements will support our nation by increasing equitable access to occupational and financial success while strengthening our increased global competitiveness.

... an opportunity gap exists in the late elementary/early middle grades (grades three to five) for targeted literacy interventions ...

## References

- Alexander, K., Entwisle, D., & Olsen, L. (2007). Lasting consequences of the summer learning gap. *American Sociological Review*, *72*(2), 167–180.
- Allegretto, S., & Lynch, D. (2010, October). The composition of the unemployed and long-term unemployed in tough labor markets. *Monthly Labor Review*, 3–18.
- American Educational Research Association (2004). Teachers matter: Evidence from value-added assessments. *Research Points*, *2*(2), 1–4.
- Barton, P. E. (2002). *Meeting the need for scientists, engineers, and an educated citizenry in a technological society*. Policy Information Center Report, Educational Testing Service. Retrieved from <http://www.ets.org/research/pic/meetingneed.pdf>
- Barton, P. E. (2003). *Parsing the achievement gap*. Policy Information Center Report, Educational Testing Service. Retrieved from <http://www.ets.org/research/pic/parsing.pdf>
- Barton, P. E., & Coley, R. (2009). *Parsing the achievement gap II*. Policy Information Center Report, Educational Testing Service.
- Black, A. R., Somers, M., Doolittle, F., Unterman, R., & Grossman, J. B. (2009). *The evaluation of enhanced academic instruction in after-school programs: Final report* (NCEE 2009-4077). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Bureau of Labor Statistics (2010). *Occupational Outlook Handbook, 2010-11 Edition*. Retrieved from <http://www.bls.gov/oco/oco2003.htm#industry>
- Chall, J. S., & Jacobs, V. A. (2003). Poor children's reading slump. *American Educator*, *27*(1), 14–17.
- Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (1990). *The reading crisis: Why poor children fall behind*. Cambridge, MA: Harvard University Press.
- Coley, R. J. (2002). *An uneven start: Indicators of inequality in school readiness*. Policy Information Center Report, Educational Testing Service. Retrieved from <http://www.ets.org/research/dload/Unevenstart.pdf>
- Coley, R. J. (2003). *Growth in schools revisited: Achievement gains from the fourth to the eighth grade*. Policy Information Center Report, Educational Testing Service. Retrieved from [http://www.ets.org/Media/Education\\_Topics/pdf/growth2.pdf](http://www.ets.org/Media/Education_Topics/pdf/growth2.pdf)
- College Board (2010). *2010 College-Bound Seniors Total Group Profile Report*. New York: The College Board.
- Cooper, H., Charlton, K., Valentine, J., & Muhlenbruck, L. (2000). *Making the most of summer school*. Monographs of the Society for Research in Child Development. Malden, MA: Blackwell.
- Cooper, H., Nye, B., Charlton, K., Lindsay, J., & Greathouse, S. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. *Review of Education Research*, *66*(3), 227–268.

- Danziger, S., & Ratner, D. (2010). Labor market outcomes and the transition to adulthood. *Future of the Children, 20*(1), 133–158.
- Dee, T. S., & Jacob, B. (2009). *The impact of No Child Left Behind on student achievement* (NBER Working Paper No. 15531). Retrieved from <http://www.nber.org/papers/w15531>
- Dynarski, M., James-Burdumy, S., Moore, M., Rosenberg, L., Deke, J., & Mansfield, W. (2004). *When schools stay open late: The national evaluation of the 21st Century Community Learning Centers program: New findings*. U.S. Department of Education, National Center for Education Evaluation and Regional Assistance. Washington, DC: U.S. Government Printing Office.
- Dynarski, M., Moore, M., Mullens, J., Gleason, P., James-Burdumy, S., Rosenberg, L., Pistorino, C., Silva, T., Deke, J., Mansfield, W., Heaviside, S., & Levy, D. (2003). *When schools stay open late: The national evaluation of the 21st Century Community Learning Centers program: First-year findings*. Report submitted to the U.S. Department of Education. Princeton, NJ: Mathematica Policy Research, Inc.
- Forum on Educational Accountability (2004). Joint Organizational Statement on No Child Left Behind. Retrieved from <http://edaccountability.org/>
- Hart, B., & Risley, T. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore, MD: Brookes Publishing.
- Hirsch, E. D. Jr. (2003). Reading comprehension requires knowledge — of words and the world: Scientific insights into the fourth-grade slump and the nation’s stagnant comprehension scores. *American Educator, 27*, 10–29.
- James-Burdumy, S., Dynarski, M., Moore, M., Deke, J., & Mansfield, W. (2005). *When schools stay open late: The national evaluation of the 21st Century Community Learning Centers program: Final report*. U.S. Department of Education, National Center for Education Evaluation and Regional Assistance. Washington, DC: U.S. Government Printing Office.
- Kirsch, I., Braun, H., Yamamoto, K., & Sum, A. (2007). *America’s perfect storm: Three forces changing our nation’s future* (ETS Policy Information Report). Princeton, NJ: Educational Testing Service.
- Lee, J. (2006). *Tracking achievement gaps and assessing the impact of NCLB on the gaps: An in-depth look into national and state reading and math outcome trends*. Cambridge, MA: The Civil Rights Project at Harvard University.
- Lewis, S., Simon, C., Uzzell, R., Horwitz, A., & Casserly, M. (2010). *A call for change: The social and educational factors contributing to the outcomes of black males in urban schools*. Washington, DC: The Council of the Great City Schools. Retrieved from [http://www.cgcs.org/cms/lib/DC00001581/Centricity/Domain/27/Call\\_For\\_Change.pdf](http://www.cgcs.org/cms/lib/DC00001581/Centricity/Domain/27/Call_For_Change.pdf)
- Linn, R. L., Baker, E. L., & Betebenner, D. W. (2002). Accountability systems: Implications of requirements of the No Child Left Behind Act of 2001. *Educational Researcher, 31*(6), 3–16.
- Nagy, W. E., & Anderson, R. C. (1984). Learning words from context. *Reading Research Quarterly, 20*, 233–253.

- Partnership for 21st Century Skills (2008). *21st century skills, education, and competitiveness: A resource and policy guide*. Retrieved from [www.21stcenturyskills.com](http://www.21stcenturyskills.com)
- Pianta, R., Barnett, W., Burchinal, M., & Thornburg, K. (2009). The effects of preschool education: What we know, how public policy is or is not aligned with the evidence base, and what we need to know. *Psychological Science in the Public Interest*, *10*(2), 49–88.
- Pritchard, R., & Breneman, B. (2000). *Strategic teaching and learning: Standards-based instruction to promote content literacy in grades four through twelve*. Sacramento, CA: California Department of Education.
- Rosenshine, B. (2002). Helping students from low-income homes read at grade level. *Journal of Education for Students Placed at Risk*, *7*, 273–283.
- Rothstein, R. (2004). *Class and schools: Using social, economic, and educational reform to close the black-white achievement gap*. Washington, DC: Economic Policy Institute.
- Stanovich, K. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, *21*(4), 360–406.
- Sum, A., Kirsch, I., & Yamamoto, K. (2004). *Pathways to labor market success: The literacy proficiency of U.S. adults* (ETS Policy Information Report). Princeton, NJ: Educational Testing Service.
- Tienda, M. (2009, March). Hispanicity and educational inequality: Risks, opportunities, and the nation's future. The 25th Tomas Rivera Lecture presented at the annual conference of the American Association of Hispanics in Higher Education, San Antonio, TX.
- Turkheimer, E., Haley, A., Waldron, M., D'Onofrio, & Gottesman, I. I. (2003). Socioeconomic status modifies heritability of IQ in young children. *Psychological Science*, *14*(6), 623–628.
- U.S. Census Bureau (2002). *The big payoff: Educational attainment and synthetic estimates of work-life earnings*. Current Population Reports. Retrieved from <http://www.census.gov/prod/2002pubs/p23-210.pdf>
- U.S. Department of Education (2010a). *Reading 2009: National assessment of educational progress at grades 4 and 8* (NCES 2010-458). Washington, DC: National Center for Education Statistics, Institute for Education Sciences.
- U.S. Department of Education (2010a). *Grade 12 Reading and mathematics 2009 national and pilot state results: National assessment of educational progress* (NCES 2011-455). Washington, DC: National Center for Education Statistics, Institute for Education Sciences.
- Wiley, A., Proctor, T., & Wyatt, J. (2010). *PSAT/NMSQT® indicators of college readiness* (College Board Research Report No. 2010-4). New York: The College Board.
- Wiley, A., Wyatt, J., & Camara, W. (2010). *The development of a multidimensional college readiness index* (College Board Research Report No. 2010-3). New York: The College Board.



# The Research & Development department actively supports the College Board's mission by:

- Providing data-based solutions to important educational problems and questions
- Applying scientific procedures and research to inform our work
- Designing and evaluating improvements to current assessments and developing new assessments as well as educational tools to ensure the highest technical standards
- Analyzing and resolving critical issues for all programs, including AP<sup>®</sup>, SAT<sup>®</sup>, PSAT/NMSQT<sup>®</sup>
- Developing standards and conducting college and career readiness alignment studies
- Publishing findings and presenting our work at key scientific and education conferences
- Generating new knowledge and forward-thinking ideas with a highly trained and credentialed staff

## Our work focuses on the following areas

Admission	Measurement
Alignment	Research
Evaluation	Trends
Fairness	Validity

