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# Using Research to Answer Practical Questions About Homework

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The article begins with a presentation of reasons for the minimal influence of homework research, and educational research in general, on policy and practice. We propose that the practical use of research is hampered by the complexity of real-world settings, by flawed research designs, and by the probabilistic nature of research outcomes. Systematic research syntheses are offered as providing one way to overcome these difficulties. This special issue is a case example. To set the stage for the articles and discussion that follow, a definition for homework is offered along with a brief history of public attitudes toward homework and a listing of positive and negative effects attributed to homework. Then, the results of a research synthesis and a survey study are described that provide evidence for answering a complex and controversial question: How much time should students spend on homework each night? Little association is found between the amount of homework young students complete and achievement. The association grows progressively stronger for older groups of students. Other research suggests that young children have limited ability to keep their attention focused and have not learned good study skills. Two examples are provided showing how the research results can be used to evaluate the appropriateness of recommendations for policy and practice.

Homework has been an active area of investigation among U.S. educational researchers for the past 75 years. As early as 1927, a study compared the effects of homework versus in-school supervised study on the achievement of 11- and 12-year-olds (Hagan, 1927). However, researchers have been far from unanimous in their assessments of the benefits and limitations of homework. Different researchers have gathered evidence that homework has positive effects on achievement (e.g., Austin, 1979; Foyle, 1984; Keith & Cool, 1992; Keith et al., 1993; North Carolina Department of Public Instruction, 1983; Pendergrass, 1985;), negative (Barber, 1986), or inconsistent (Bents-Hill et al., 1988; Epstein, 1983; Friesen, 1979).

Even reviews of empirical studies of homework intended to provide a synthesis of the discrepant studies often bring researchers no closer to a clear-cut answer. Cooper (1989a) found 11 reviews of the effects of homework on achievement that were conducted between 1960 and 1987. Five reviewers suggested that homework had a generally positive effect on achievement (Austin, 1979; Goldstein, 1960; Keith 1986, 1987; Paschal, Weinstein, & Walberg, 1984), whereas six reviewers determined that no conclusion could be drawn be-

cause of a lack of trustworthy evidence (Coulter, 1979; Friesen, 1979; Harding, 1979; Knorr, 1981; Marshall, 1983; Otto, 1950).

## THE INFLUENCE OF HOMEWORK RESEARCH ON POLICY AND PRACTICE

Not surprisingly then, the role of research in forming homework policies and practices has been minimal. Policymakers look to bodies of evidence in the hope that research will provide clear-cut results that assist in making sound decisions about which programs to continue, expand, or abandon. Practitioners use research as one source with which to make decisions about homework. Yet, the promise of evidence-based decision making in areas such as homework, and in the educational policy arena in general, remains largely unfulfilled (cf. Viadero, 1999). In fact, skepticism, if not outright cynicism, exists about the value of research for helping to form all public policy (cf. Greene, 1998). Many policymakers, practitioners, and the public have watched as advocacy groups on opposite sides of an issue point to studies that support their position but conflict with one another. They have watched researchers question the trustworthiness of each other's findings, leading to diminished credibility for all research.

These episodes, and the resulting perception of a diminished value for empirical evidence in setting policy, can be traced to at least three characteristics of educational research. First, broad-brush policies, programs, and guidelines for practice are carried out in real-world contexts. The complexities of setting introduce factors that influence whether or not a policy or practice will produce the desired results. The important nuances of setting are difficult to recognize and even more difficult to represent within the confines of a single study. Thus, studies that appear quite similar may produce different results for subtle reasons.

Second, for both ethical and practical reasons, educational research is frequently carried out using designs that do not permit strong causal inferences. This reality means that explanations for the outcome of a study other than the effectiveness of the policy or practice itself will remain plausible. For example, the hallmark of a true experiment—the use of random assignment of participants to groups and groups to treatments—is almost never possible in education research in which students are already assigned to class groups when the researchers enter the schools. At best, field experimenters can hope to be able to assign class groups to treatments in some stratified random fashion. Third, the outcome of any single study is probabilistic in nature, based as it is on samples drawn from populations. Therefore, when many studies on the same topic have been conducted, variation in their outcomes (in the direction as well as the magnitude of effects) is not surprising. Indeed, such variation is expected. Often, this variation due to sampling uncertainty is mistakenly labeled as “conflicting results.”

Research on homework provides a stellar example of each of these three difficulties. First, the influences on homework are multiple and complex. Teachers can structure and monitor homework in a multitude of ways. Student differences play a major role because homework allows students considerable discretion about whether, when, and how to complete assignments. The home environment influences the process by creating an atmosphere that fosters or inhibits study. Finally, the broader community plays a role by providing other leisure activities that compete for the student’s time. Thus, it is unreasonable to assume that a simple, general finding about homework applicable to all children is likely to emerge.

Another difficulty in drawing conclusions from the research on homework lies in the quality of empirical studies conducted in this field. Studies are often poorly conceptualized or contain methodological flaws that fail to protect against threats to validity. Some flaws are caused by poor planning on the part of researchers, but others are a function of the limited resources currently available to study education and yet others of ethical constraints. Specifically, researchers may be sensitive to the possibility that withholding a treatment, even a treatment as simple as homework, may have negative consequences for the students randomly chosen for the group not exposed to the treatment. For, example, Cooper (1989a) reported only 9 of

33 samples comparing students who did homework with students who did no homework or had supervised study employed random assignment.

Finally, homework research is plentiful enough that, based on probability alone, studies can be found to promote whatever position is desired, whereas the counterevidence is ignored. Thus, advocates for or against homework often cite isolated studies either to support or refute its value (see Table 1). This is exemplified by many previous reviews of homework research. The conclusions of reviews of homework research have varied in part due to a lack of overlap in the literature they covered, to different criteria for inclusion of studies, and to different methods for the synthesis of study results.

The Promise of Systematic Research Reviews

After decades of neglect, many social scientists now agree that potential solutions to all three of these problems can be found

TABLE 1  
Distribution of Correlations Between Time on Homework and Achievement-Related Outcomes<sup>a</sup>

| <i>Correlations</i> | <i>Grades</i> |
|---------------------|---------------|
| .39, .40            |               |
| .37, .38            | S             |
| .35, .36            |               |
| .33, .34            | J             |
| .31, .32            |               |
| .29, .30            | J             |
| .27, .28            | SS            |
| .25, .26            | JJSSS         |
| .23, .24            | JSS           |
| .21, .22            | JJS           |
| .19, .20            | JSSSS         |
| .17, .18            | SS            |
| .15, .16            | SS            |
| .13, .14            | JSS           |
| .11, .12            | J             |
| .09, .10            | EJJJ          |
| .07, .08            | EEJ           |
| .05, .06            | EEEJS         |
| .03, .04            |               |
| .01, .02            | SS            |
| .00                 | —             |
| −.01, −.02          | E             |
| −.03, −.04          |               |
| −.05, −.06          | EE            |
| −.07, −.08          | J             |
| −.09, −.10          |               |
| −.11, −.12          | E             |
| −.13, −.14          |               |
| −.15, −.16          | J             |
| −.17, −.18          | J             |
| −.19, −.20          |               |

*Note.* Correlations are distinguished by grade level. S = Grades 10 through 12; J = Grades 6 through 9; E = Grades 3 through 5.

not only in how individual studies are carried out (e.g., more rigorous designs, larger samples) but also in how bodies of evidence are treated after the results of multiple studies have accumulated (cf. Campbell Collaboration, 2000). First, through systematic research synthesis, the influence of context on the outcomes of policy, program, and practice evaluations can be examined by comparing studies that use varying participants, settings, and treatment characteristics. Context effects can be examined in research reviews even though no single study contained all the variations. Second, multiple studies can also be grouped according to the strengths and weaknesses of their designs. If studies with different strengths and weaknesses lead to similar results, greater confidence can be placed in a review's conclusion than in the results of any single evaluation. If results are different, rival hypotheses can be precisely identified for testing through future study. Finally, by statistically combining the results of multiple studies the general effect of a policy, program, or practice can be pinpointed much more precisely than in a single investigation. The expected variation about this midpoint can also be estimated.

Because of the potential value of systematic research reviews, both the producers and consumers of reviews now agree that high-quality syntheses are essential if social scientists are to reverse policymakers and practitioners' skepticism about the value of research for assisting the development of effective public policy.

### THE GOALS OF THIS ISSUE AND ARTICLE

This special issue of *Educational Psychologist* is an attempt to make greater sense of the homework literature through the presentation of a set of interrelated research syntheses. In looking closely at the views of students about homework, Pamela Warton finds that students' perceptions are frequently left out of research. She suggests that understanding student ideas and understandings regarding the purposes and value of homework can be an important component to understanding student motivation and performance on homework. Tanis Bryan, Karen Burstein, and James Bryan address the gap that exists between what research says will be successful homework strategies for children with learning disabilities and the types of homework these students typically are assigned. Successful strategies appear to use greater involvement from others and greater structure in the assignment. Kathleen Hoover-Dempsey, Angela Battiato, Joan Walker, Richard Reed, Jennifer DeJong, and Kathleen Jones closely examine research on why and how parents help their children with homework and provide suggestions for improving parental help. Joyce Epstein and Frances Van Voorhis address teacher roles in homework, focusing specifically on how teachers design homework and on programs addressing more effective educator-home collaboration in homework design. Merith Cosden, Gale Morrison, Ann Leslie Albanese, and

Sandra Macias examine the potential for after-school homework programs to enhance achievement and prevent school failure. Although few after-school programs focusing specifically on homework have been evaluated, research does point to some important components that such programs ought to contain.

In the remainder of this article, we demonstrate the power of research for assisting policymaking by using the results of a quantitative research synthesis and a relatively large survey study. We focus on the single most general and fundamental, yet most complex and controversial, question about homework: How much time should students spend on homework? However, before turning to the issue of time on homework, it will be helpful to provide a broader context for both our discussion and the articles that follow by briefly defining homework and describing the history of public attitudes toward homework. We also list some of the positive and negative effects on students often attributed to homework assignments.

### DEFINITION OF HOMEWORK

In discussing what research has to say about amounts of homework, we define homework as "tasks assigned to students by schoolteachers that are meant to be carried out during non-school hours" (Cooper, 1989a, p. 7). This definition does not include in-school tutoring, nonacademic extracurricular activities (i.e., clubs, sports), or home study courses offered through mail, television, or other media. In addition, we restrict our comments about homework to tasks assigned by teachers who teach Grades kindergarten through 12. Homework assigned to preschool children and college students clearly raises unique sets of issues.

### PUBLIC ATTITUDES TOWARD HOMEWORK

Public attitudes toward homework have been cyclical (Gill & Schlossman, 1996). Early in the twentieth century, educational theories suggested that homework could be an important means for disciplining children's minds. By the 1940s, a reaction against homework set in. Developing problem-solving abilities, as opposed to learning through drill, became a central task of education. Moreover, the life-adjustment movement viewed home study as an intrusion on other private, at-home activities.

The trend toward less homework was reversed in the late 1950s after the Soviets launched the Sputnik satellite. U.S. educators became concerned that a lack of rigor in the educational system was leaving children unprepared to face a complex technological future and to compete against our ideological adversaries. Homework was viewed as a means for accelerating the pace of knowledge acquisition. By the mid-1960s, the cycle again reversed itself. Homework came

to be seen as a symptom of too much pressure on students. Contemporary learning theories again questioned the value of homework, and the possible detrimental mental health consequences of too much homework were brought to the fore. Wildman (1968) wrote, "Whenever homework crowds out social experience, outdoor recreation, and creative activities, and whenever it usurps time devoted to sleep, it is not meeting the basic needs of children and adolescents" (p. 203).

By the mid-1980s, views of homework again shifted toward a more positive assessment (National Commission on Excellence in Education, 1983). In the wake of declining achievement-test scores and increased concern about America's ability to compete in a global marketplace, homework underwent its third renaissance in the past 50 years.

Several conclusions can be drawn from this history. First, homework is an important part of most school-aged children's daily routine in that a significant percentage of their out-of-school time may be devoted to its management and completion. Second, it is also clear that not all teachers assign homework and not all students do homework that is assigned. This suggests significant variation across students in the distribution of effects of homework. Third, most educators believe homework can be an important supplement to in-school academic activities (see as well, Henderson, 1996). Fourth, public attitudes toward homework have been more closely tied to the prevailing broader social philosophy and to national and international economic trends than they have to the research on homework's effectiveness.

### POSITIVE AND NEGATIVE EFFECTS OF HOMEWORK

The array of potential positive and negative effects of homework found in both the educational and popular literature is broad and often surprising (see Corno, 1996, 2000, for related discussions). Among the suggested positive effects of homework proposed by educators and parents, the most obvious is that it will have an immediate effect on the retention and understanding of the material it covers. More indirectly, homework will improve students' study skills, improve their attitudes toward school, and teach them that learning can take place anywhere, not just in school buildings between 8 a.m. and 4 p.m.

There are many potential nonacademic benefits to homework as well, most of which relate to fostering independent and responsible character traits. Finally, homework can involve parents in the school process, enhancing their appreciation of education and allowing them to express positive attitudes toward their children's achievement.

The suggested negative effects of homework make more interesting reading. First, some educators and parents point out that any activity can remain rewarding for only so long. Thus, if students are required to spend too much time on academic material, they are bound to grow bored with it. Second,

homework denies access to leisure time and community activities that can teach important lessons, both academic and nonacademic. Third, parental involvement can often turn into parental interference. Parents can confuse children if the instructional techniques they use differ from those used by teachers. Fourth, homework can actually lead to the acquisition of undesirable character traits by promoting cheating, either through the direct copying of assignments or by help with homework that goes beyond tutoring. Finally, homework could accentuate existing social inequities. Children from poorer homes will likely have more difficulty completing assignments than their middle-class counterparts. Poorer children are more likely to work after school or may not have a quiet, well-lit place to do their assignments. Homework, it is argued, is not the great equalizer.

### THE EFFECT OF HOMEWORK ON ACHIEVEMENT

As we mentioned earlier, just as parents and educators have debated the strengths and weaknesses of assigning homework, researchers in the last few decades have not agreed on whether homework is effective at improving achievement. In 1989, the first author published a research synthesis funded by the National Science Foundation that gathered, summarized, and integrated the research on the effects of homework (Cooper, 1989a, 1989b). In an attempt to overcome the weaknesses of previous reviews, this review covered nearly 120 empirical studies of homework's effects and the ingredients of successful homework assignments. Exhaustive literature searching strategies were used to locate both published and unpublished research. Systematic procedures paralleling those used in content analysis were employed to extract data from study reports. Quantitative synthesis techniques were used to summarize all the literature, both positive and negative in outcome (see Cooper, 1998).

The meta-analysis included three kinds of studies that examined the relationship between homework and achievement. The first type of study compared the achievement levels of students who received homework to the achievement levels of students who received no homework and no other treatment to compensate for the lack of homework. In 20 independent samples, 14 favored those students who completed homework and 6 favored those who did no homework. The overall effect size was  $d = .21$ . The studies included over 3,300 students in 85 classrooms and 30 schools in 11 states. The studies contained a total of 48 usable comparisons. Of the 48 comparisons, 18 used class tests or grades as the outcome measure for homework and 30 used standardized achievement tests. Twenty-five comparisons involved achievement in mathematics, 13 looked at reading and English, and 10 involved science and social studies. The duration of the homework treatments varied considerably from study to study. The

length of studies ranged from 2 to 30 weeks, averaging between 9 and 10 weeks.

In addition to a general positive outcome for homework, these studies revealed a strong relationship between the grade level of the student and the effect that homework had on student achievement. At the high school level, the effect size for homework indicated that students doing assignments also scored about two thirds of a standard deviation higher than students not doing homework ( $d = .64$ ). At the junior high level, the average relationship was about one half the magnitude of the effect found at the high school level ( $d = .31$ ). The effect size at the elementary school level was only one fourth that of the high school level ( $d = .15$ ).

The next evidence compared homework to in-class supervised study. Eight studies contained 18 comparisons of the two treatments, based on 10 independent samples containing over 1,000 students in 40 classrooms and 10 schools in six states. Overall, the positive relationship was about one half what it was when homework was compared to no treatment ( $d = .09$ ). This is not a surprising result given that these studies are really comparing two alternate treatments. It is easy to imagine ways to manipulate homework assignments, the definition of supervised study, or both so as to produce results favoring one treatment or the other. Most important was the emergence once again of a strong grade-level effect. When homework and in-class study were compared in elementary schools, in-class study proved superior.

The third type of study used statewide and national surveys that correlated the amount of homework students completed with students' achievement-test scores. Literally hundreds of thousands of students from around the country were included in these surveys. Of 50 correlations, 43 indicated that students who did more homework also showed higher achievement scores. Like the studies comparing homework versus no-homework or supervised study, the correlational studies showed the relationship to be influenced by the grade level of students. Table 1 displays these correlations in a stem-and-leaf display. For students in Grades 3 through 5, the correlation between time spent on homework and achievement was near zero. For students in Grades 5 through 9, the correlation rose to  $r = .07$ , suggesting of a weak relationship between grades and time spent on homework. For high school students, the correlation increased to  $r = .25$ , suggesting a moderate relationship between grades and time spent on homework. The subject matter covered by the assignment did not affect the relationship between homework and achievement for any of the types of evidence included in the meta-analysis.

After the publication of the meta-analysis, researchers have reported several correlational studies using large sample sizes. The first of these studies used over 3,000 third and sixth grade students from 51 school districts in Indiana (Bents-Hill et al., 1988). The researchers correlated both the number of days parents reported their children did homework and the total time spent on homework with achieve-

ment-test scores and educator-assigned grades. For third-grade students, the correlations were negative, ranging from  $r = -.22$  to  $r = -.09$ . For sixth-grade students, the correlations were positive but small, ranging from  $r = .00$  to  $r = .15$ .

Another study used the 1980 and 1982 High School and Beyond longitudinal database (Keith & Cool, 1992). Students were tested as sophomores and as seniors. The study found a zero-order correlation of .30 between time spent on homework and achievement ( $N = 25,875$ ).

In sum then, a quantitative synthesis of research using three different research designs conducted on thousands of students from across the United States revealed that students who did homework generally outperformed students who did not. Some instances of negative relationships were revealed and, through the use of homogeneity analyses (see Cooper, 1998), it was determined that these differences could not be explained by sampling uncertainty alone. Most dramatically, all three forms of evidence suggested that the relationship between homework and achievement was moderated by the students' age or grade level. Doing homework was more strongly associated with achievement for high school than middle school students and for middle school than elementary school students. Table 2 summarizes the effect sizes associated with these conclusions.

### Why is Homework More Closely Associated With Achievement in Secondary Than Elementary Grades?

The research relating homework to achievement consistently finds that the relation between time spent on homework and achievement is weaker for students in elementary school than secondary school. There are several plausible explanations for this difference. Two explanations seem well established. First, research in cognitive psychology indicates that age differences exist in children's ability to selectively attend to stimuli (Lane & Pearson, 1982; Plude, Enns, & Brodeur, 1994). Younger children are less able than older children to ignore irrelevant information or stimulation in their environment. Therefore, we could extrapolate that the distractions

TABLE 2  
Effect Sizes for Research Bearing on Homework's Effectiveness  
Moderated by Grade Level

| Moderators  | Homework Versus<br>No Homework | Homework Versus<br>Supervised Study | Time Spent on<br>Homework |
|-------------|--------------------------------|-------------------------------------|---------------------------|
| Overall     | .21                            | .09                                 | .39                       |
| Grade level |                                |                                     |                           |
| Elementary  | .15                            | -.08                                | .04                       |
| Junior high | .31                            | .24                                 | .14                       |
| Senior high | .64                            | .33                                 | .53                       |

Note. Effect sizes for time spent on homework are  $d$  indexes converted from  $r$  indexes.

present in a young child's home environment would make home study less effective for them than for older students. Xu and Corno (1998) provide case study evidence regarding how third graders try to cope with distractions in their homework environment. They attempt to use cognitive strategies to protect against external distractions (e.g., a little sister walking in and out of the room, a parent having a conversation) and internal distractions (e.g., hunger, desires to engage in other activities). Parents also helped the third graders by either removing distractions from the environment and by refocusing their attention when it began to wander.

Second, younger children appear to have less-effective study habits, thus diminishing the amount of improvement in achievement that might be expected from homework given to them. For example, Dufresne and Kobasigawa (1989) had first-, third-, fifth-, and seventh-grade students study booklets of paired-word items. They found that fifth and seventh graders spent more time studying harder items and were more likely to achieve perfect recall. Older students were also more likely to use self-testing strategies to monitor how much of the material they had learned.

At least four other explanations for the weak relationship between homework and achievement in early grades are possible. These relate more directly to the amount and purposes of homework assigned by teachers, rather than to the child's ability to benefit from study at home. The first explanation is that students in elementary school are not assigned as much homework as students in secondary school so the amount they do varies less from student to student. If this is so, the relationship between homework and achievement would not be as strong in elementary school as in secondary school because the more restricted range of assignment lengths in earlier grades makes it statistically more difficult for a relationship to appear between the two variables.

The second explanation posits that teachers use homework to serve different purposes for students at different grade levels. Teachers of younger students, relative to teachers of older students, may assign homework less often to help students learn material and more often to teach students how to manage their time and study effectively.

The third hypothesis distinguishes between the amount of homework given to children with better academic skills from that given to children with poorer academic skills. Teachers of early grades may identify students who seem to be falling behind in school and may try to help these students by assigning them more homework. Thus, although doing more homework may cause higher achievement, this relationship may be masked in correlational studies because poorer student achievement also is causing teachers to assign more homework. In upper grades, teachers may be less likely to assign different amounts of homework based on the achievement levels of students because there is a prescribed amount of homework associated with the class material (e.g., read a novel, complete problems at the end of the chapter). If these different decision-making patterns ex-

ist between lower-grade and upper-grade teachers, researchers may find weaker correlations between homework and achievement at lower grades even though the causal effect of homework on achievement is no different at lower- and upper-grade levels.

The fourth hypothesis differs from the third in that it assumes that all students, regardless of ability, receive the same homework assignments from teachers. However, students achieving at a lower level may take longer than higher achieving students to complete the same assignment. So, an increase in achievement caused by doing homework may be offset in correlational studies by the fact that poor-performing students also take longer to complete assignments. If this relation is stronger among younger than older students, it also could explain the difference in the strength of correlations without suggesting a lesser causal effect of homework on achievement. None of the four explanations are mutually exclusive; each may contribute to why the correlation between amount of time spent on homework and achievement is weaker in elementary school than secondary school.

We used the data from a survey study to test these four hypotheses (Muhlenbruck, Cooper, Nye, & Lindsay, 1999). In 1994, the Office of Educational Research and Improvement funded a research project directed by the first author that involved a survey of students, their teachers, and one of the students' parents concerning homework policies and practices. Three adjacent public school districts agreed to take part in the survey research: (a) a large metropolitan school district, (b) a suburban school district adjacent to the urban district, and (c) a rural school district. Students, parents, and teachers were sampled primarily from 2nd, 4th, 6th, 8th, 10th, and 12th grades. A questionnaire was developed for this study, the Homework Process Inventory (HPI), that had six different versions for lower-grade and upper-grade students, their teachers, and their parents. Participants answered questions regarding time on homework, the involvement of others (e.g., parents) in homework, where homework is completed, and attitudes about homework using a structured-response format. Achievement measures were used that were collected as part of the participating districts' and classes' typical testing schedule. The response rate among teachers was approximately 80% and among parents and students approximately 35%. Although the response rate was somewhat lower than we would have liked, it was not surprising given that we needed data from three different sources to have a usable data unit. Our analysis of responders showed that students who were White, female, and not eligible for free lunch were somewhat overrepresented in our sample, a finding typical of survey research (Mangione, 1998). The relatively low response rate raises the legitimate concern that respondents could have more favorable attitudes toward homework than nonrespondents, a factor that should be kept in mind as we discuss the survey results (see Cooper, Lindsay, Nye, & Greathouse, 1998, for a detailed description of the survey methodology).

When the data were analyzed, a total of 709 complete student and parent questionnaires were available associated with 82 teachers. Analyses of student and teacher responses to the HPI, revealed only two significant results. However, because we employed the classroom as the unit of analysis the sample sizes for our tests ranged from 22 to 82 and correlations had to range from .41 to .22, respectively, in order to reach significance. Therefore, as we assessed the evidence on each hypothesis, we examined both the significance and direction of findings.

The first hypothesis, which stated that elementary school students receive less variation in amounts of assigned homework than secondary students, received little support. Not surprisingly, the comparison by grade level showed that the amount of assigned homework increased throughout both elementary and secondary school. The correlation between amount of homework and grade level for elementary students was positive using both teacher estimates,  $r(26) = .39, p < .04$ , and students' estimates,  $r(22) = .14, ns$ , but was significant only for teachers. The correlation between homework and grade level for secondary school only was positive and significant for teacher estimates,  $r(50) = .37, p < .007$ , and positive but not significant for student estimates,  $r(41) = .24, ns$ .

However, we found little evidence that the amount of variation in homework assignments increased with grade level. The comparison of variation between second and fourth grades was not significant for either educator estimates of amount assigned,  $F(16,10) = 1.64, ns$ , or student estimates,  $F(14,8) = 1.02, ns$ . For secondary grades, teachers' estimates of the amount of homework assigned showed no linear trend, with 6th-grade teachers revealing more variation in the amount of homework assigned than 8th-grade teachers and 10th-grade teachers showing more variation than 12th-grade teachers. Student reports did show a linear increase in variation but the comparison between 6th and 12th grade was still not significant,  $F(7,10) = 2.71, ns$ . Thus, we would have to conclude that the weaker correlations in elementary school are not caused by a restriction in the range of amount-of-homework values.

The second hypothesis, which asserted that homework serves different purposes at the elementary and secondary levels, received partial support. We looked at three questions asked of our respondents about the utility of homework: whether homework helps students learn, whether homework helps students develop study skills, and whether homework helps students develop time-management skills. The average responses to these questions suggested that most teachers use homework for all three purposes at all grade levels. Differences in mean scores suggested homework was viewed as more useful for all three purposes among elementary than secondary teachers, but only the mean difference for the third question, concerning time-management skills, was statistically significant,  $r(78) = -.23, p < .04$ . Table 3 displays the data underlying these results.

These results suggest that homework does serve somewhat different functions at elementary and secondary levels.

Lawrence Erlbaum Associates, Inc. does not have electronic rights to Table 3. Please see the print version.

At the elementary level, teachers may assign homework more often to prepare students for the rigors of future grades by helping students develop time-management skills. If elementary teachers assign homework to improve these skills more often than secondary teachers, homework at the elementary level may not focus as much on the material covered on achievement tests, but instead on teaching students how to manage their time and study. Although these are valuable skills that will serve students later in their academic career, progress toward this goal will not show up immediately on achievement tests.

The third hypothesis, which stated that teachers give students who are having trouble more homework to help them catch up, failed to receive support. In fact, the data suggested the opposite may be happening. In elementary school, the correlation between the amount of homework and class-level achievement was positive, although not significant using either teacher reports,  $r(26) = .12, ns$ , or student reports,  $r(22) = .18, ns$ . This suggests that teachers may assign more homework to elementary school classes with higher achievement. At the secondary level, the correlation was negative but not significant using either teacher reports,  $r(37) = -.27, ns$ , or student reports,  $r(31) = -.31, ns$ . In this case, it is possible that students who are doing poorly receive more homework. Regardless, the notion that a positive relationship between doing more homework causes higher achievement may be masked in early grades because poorer student achievement also is causing teachers to assign young children more homework clearly was not supported.

Finally, the fourth hypothesis stated that students who are lower achievers may take more time than higher achiev-



ers to finish the same assignments, and this phenomenon might be more pronounced at the elementary level. The survey data suggested that the within-class correlations were in the predicted direction, revealing more negative relations between time spent on homework and achievement within elementary school classrooms, but not significantly so. Specifically, to test the hypothesis a correlation was calculated within each class between student reports of time spent on homework and the students' achievement test scores. If the within-class correlation was more negative in elementary school classes than secondary school classes, then this relationship could account for the lower overall correlation between time spent on homework and achievement, even if homework had a positive effect on achievement. For elementary school classes, the average within-class correlation between student reports of time spent on homework and achievement was negative and not significant,  $r(20) = -.13$ , *ns*. At the secondary level, this relationship was also negative but again did not reach significance,  $r(34) = -.03$ , *ns*. To determine whether the average correlation at the two grade levels were statistically different, we entered the grade level into a multiple regression to predict the average within-class correlations. The grade level effect was not significant,  $F(1, 56) = .76$ , *ns*. Thus, the fourth hypothesis, although not statistically significant here, did suggest it could help explain the low correlation between homework and achievement at the elementary level.

### Is There an Optimal Amount of Homework?

In addition to studies that contained data estimating the simple correlation, the homework meta-analysis (Cooper, 1989a) found nine studies that reported levels of achievement for different amounts of time spent on homework. The nine studies included a total of 13 independent samples.

By making some considered assumptions, the independent samples could be combined to assess the possibility that there were optimum amounts of homework. Such a relation would be consistent with results in related areas. For instance, the relationship between time-on-task and achievement seems to reach a plateau at which increases in time have only a marginal effect on learning (Frederick & Walberg, 1980). This could also be the case with time on homework.

Figure 1 presents the results of the analysis. The meta-analysis revealed that for high school students the positive relation between time on homework and achievement did not appear until at least 1 hr of homework per week was reported. Then the linear relation continued to climb unabated to the highest measured interval (more than 2 hr). In contrast, for junior high students the positive relation appears for even the most minimal level of time on homework (less than 1 hr) but disappears entirely at the highest interval, flattening out after students reported doing between 1 and 2 hr each night.

Only one study was available for Grades 1 through – 6 (Hinckley et al., 1979). It seemed unwise to draw any conclusions about possible curvilinear relations for elementary school students based on a single study but the lack of a simple linear relationship at these grade levels suggests the line would be flat.

## IMPLICATIONS FOR POLICY AND PRACTICE

To demonstrate how research can be used to inform policy and practice, we examine the relevance of our results for two highly visible sets of policy recommendations.

### What Works

In the 1980s, the U.S. government published a booklet titled *What Works* (U.S. Department of Education, 1986). *What Works* is intended to be a distillation of research on teaching and learning. In compiling the topics for the booklet, the Department of Education claimed it had “included only those findings about which research evidence and expert opinion were consistent, persuasive, and fairly stable over time” (p. 1). The booklet also contained the caution, however, that some research findings may “seem to be oversimplifications of complex phenomena or premature resolutions of hotly contested disputes” (p. 1).

*What Works* contains a section that relates to the quantity of homework. The section begins with a statement of the research finding that “Student achievement rises significantly when teachers regularly assign homework and students conscientiously do it” (p. 41). The section goes on to report that “Extra studying helps children at all levels of ability” (p. 41) and “Homework boosts achievement because the total time spent studying influences how much is learned” (p. 41). A figure is presented that shows a strong linear relation among high school seniors between amount of homework per week and test scores. No mention is made of the influence of age or cognitive stage of development on these effects.

Based on the findings of the meta-analysis, there is a major qualifier to *What Works*' assertions—they apply only to high school students. The meta-analysis showed that junior high school students doing 5 to 10 hr of homework a week performed no better on achievement tests than students doing 1 to 5 hr. In the upper-level elementary school grades, there was little relation between time on homework and achievement. Thus, in the context of high-school-level education, *What Works*' “the more the better” approach to homework may be consistent with research findings. If applied to earlier grades, however, the research indicates that “the more the better” approach may be misleading at best and ought not be used as a basis for policy and practice.

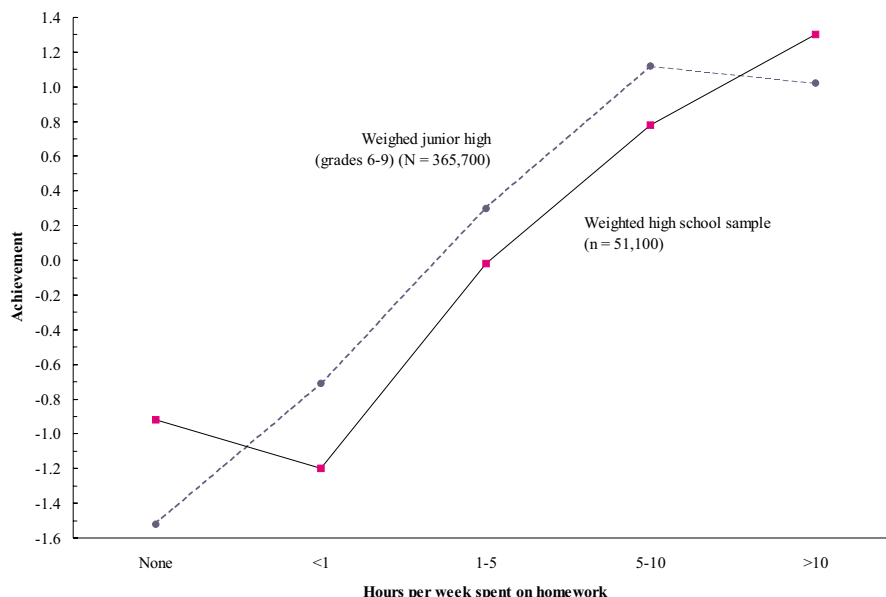


FIGURE 1 Relationship between achievement and time spent on homework at two schooling levels. The achievement scale is based on standardized, within-study ( $n = 9$ ) mean achievement for each level of homework.

## The National Parent–Teachers Association and the National Education Association

The National PTA and the NEA have a parent guide called “Helping Your Child Get the Most Out of Homework” (Henderson, 1996). It states

Most educators agree that for children in grades K-2, homework is most effective when it does not exceed 10–20 minutes each day; older children, in grades 3–6, can handle 30–60 minutes a day, in junior and senior high school, the amount of homework will vary by subject.... (p. 1)

These recommendations are consistent with the conclusions reached by the combined analyses of dozens of studies. They not only recognize the effect of a student’s developmental stage on the effectiveness of homework, but the recommendations also accurately reflect the point at which research on middle and junior high school students suggest time on homework reaches the point of diminishing returns.

## CONCLUSION

We have attempted to use research on a critical homework issue to show that systematic reviewing can help resolve many of the inconsistencies that *seem* to plague bodies of research evidence when individual studies are examined in a serial or selective fashion. In our example, a meta-analysis encompassing research involving thousands of students showed little correlation between homework and test scores in elementary school. However, the relationship was found to grow positive and strong in secondary school. Individual studies, necessarily more tentative than the exhaustive research synthesis, were

then used to suggest some of the causal explanations for these findings. It was found, first, that young children who are struggling in school may take longer to finish assignments. Second, young children have limited ability to keep their attention focused. Third, young children have not yet learned proper study skills. Finally, teachers, perhaps recognizing young students limited ability to benefit from too much self-study, use homework more often to teach basic study skills.

We then used the research results to evaluate the appropriateness of recommendations made in two documents meant to assist school administrators, educators, and parents establish sound policies and practices. One document contained serious omissions. The other was more consistent with the research evidence.

However, we have only scratched the surface of questions relating to homework policies and practices and their effects on children and adolescents. We also reviewed the research and popular literature that suggests homework can have beneficial effects on young children well beyond immediate achievement and the development of study skills. It can help children recognize that learning can occur at home as well as at school. Homework can foster independent learning and responsible character traits. Homework can give parents an opportunity to see what’s going on in school and express positive attitudes toward achievement. We suspect it is the pursuit of these benefits that prompt organizations such as the National PTA and NEA to suggest homework for all students, however minimal the amount may be for young children.

Yet, homework can also have negative effects. Homework may lead to boredom with school, because all activities remain interesting only for so long. Homework can deny children access to leisure activities that also teach important life skills. Parents can get too involved in homework. They can

confuse children by using different instructional techniques than the educator or interfere with their child's sense of academic autonomy.

We propose that the important question for researchers, educators, and parents is not which list of effects, the positive or negative, represent the true implications of homework. Any of these effects can occur. Rather, the next question for research is "Under what conditions and for which students can the positive and negative effects of homework be expected to occur?" The question for policymakers and practitioners is "Are the recommendations we make and the practices we espouse consistent with the best research evidence available?" As we approach answers to these questions, we should see a corresponding diminishment in the extreme swings in public attitudes toward homework.

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