



Errors and Allegations About Research on Homework

In his September *Kappan* article, Alfie Kohn questioned the need for homework, challenging several researchers who claimed to have confirmed its benefit for children of all ages. Mr. Marzano and Ms. Pickering, two of those researchers, now challenge Mr. Kohn's interpretation of the evidence.

BY ROBERT J. MARZANO AND DEBRA J. PICKERING

THE LEAD article in the September 2006 issue of the *Kappan* is titled "Abusing Research: The Study of Homework and Other Examples." Written by Alfie Kohn, it begins with a hypothetical monologue in which educational researchers address a personification of Research, confessing, "We sneak behind your back even while basking in the glow of your reputation. If you don't leave us, it must be because you're blind — maybe even double-blind — to our faults. How do we abuse you, Research? Let us classify the ways" (p. 9).

Kohn continues by detailing a variety of abuses, all of which purportedly demonstrate that educational researchers and those who attempt to translate educational research have either wittingly or unwittingly deceived the general public into believing that specific educational practices have evidence supporting their effectiveness when in fact they do not. As the title to his article indicates, he focuses primarily on homework as one of these fugitive practices. He names a number of co-conspirators and their works. Among them, he iden-

tifies *Classroom Instruction That Works*, written by the two of us and a colleague.¹ Presumably, it was selected because it has a chapter on homework.

The express purpose of that book was to translate the research pertaining to a number of instructional practices (homework being one of them) into practical suggestions for classroom teachers. In the first chapter, we explained to readers that, while we attempted to report and translate the research as accurately as possible, it would be a mistake to consider the practices reviewed in our text as "proven." We offered a concrete illustration indicating that, even for an instructional practice that has a positive average effect over a number of studies, there will surely be studies indicating that in specific contexts it does not enhance student achievement. We cautioned:

The inference that should be drawn from this illustration is that no instructional strategy works equally well in all situations. We strongly recommend that you keep this in mind as you review the strategies presented in this book and apply them in classrooms. Instructional strategies are tools only. Although the strategies in this book are certainly good tools, they should not be expected to work equally well in all situations.²

The chapter on homework attempted to review very briefly the research up to 2001. We noted that Harris Cooper's meta-analysis of the research had reported a

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positive general effect for homework but that this effect was not consistent across the grade levels.³ Specifically, Cooper reported findings in three grade-level bands: 4-6, 7-9, and 10-12.⁴ The effect size for the 10-12 band was .64, which translates into an expected gain of about 24 percentile points in a homework-versus-no-homework comparison. However, the reported effect size for the 4-6 grade-level band was only .15, which translates into an expected gain of about 6 percentile points. We also noted that Cooper still recommended homework for elementary students, even though the effect size was relatively small at the lower grade-level band.⁵ We also stated that, “since Cooper’s meta-analysis, there have been a number of studies . . . indicating that homework does produce beneficial results for students in grades as low as 2nd grade.”⁶ At the conclusion of that sentence, we cited parenthetically five studies without comment.

In his *Kappan* article, Kohn takes great exception to our comments and conclusions. About the five articles we cited, he notes:

I was frankly stunned by the extent of misrepresentation here. It wasn’t just that one or two of the cited studies offered weak support for the proposition. Rather, none of them offered any support. The claim advanced vigorously by Marzano and his colleagues — that homework provides academic benefits for younger children — actually had no empirical backing at all. (p. 17)

It is instructive to contrast Kohn’s assertions about those studies and what the studies actually report. We begin with the study by Todd Gorges and Stephen Elliott, titled “Homework: Parent and Student Involvement and Their Effects on Academic Performance.”⁷ It involved 29 third-graders and 24 fifth-graders. The academic achievement of the students was measured using their performance on assignments and tests of mathematics and spelling, as well as by an academic competence rating scale (AC) filled out by the teachers. In effect, for the latter measure, the researchers were using teacher perceptions regarding student achievement in class. In terms of examining homework practices, the researchers used three different types of measures: a survey filled out by parents, a survey filled out by teachers, and a homework log completed nightly by participating parents. This feature of the study enabled the researchers to examine the relationship between various aspects of homework and student achievement, as defined by the dependent measures used in the study (i.e., the measures of academic achievement). The re-

searchers reported their findings in two basic categories: the findings from the surveys and the findings from the logs. They also addressed two time periods for data collection.

Kohn’s comments about this study are that it

measured how much time a group of students spent on the homework they were assigned but didn’t try to determine whether it was beneficial to assign more (or, for that matter, any at all). Even so the researchers’ main conclusion was that “high amounts of homework time did not guarantee high performance.” (p. 17)

There are a number of inaccuracies in this characterization. First, Kohn’s comment that the study did not try to determine whether it was beneficial to assign more homework makes no logical sense. The very first line of the researchers’ abstract to the article reads: “The present study investigated the influence of student homework time and parental time and involvement in helping activities on grade 3 and 5 students’ academic performance.”⁸ Unless Kohn is making a distinction between amount of homework assigned and amount of homework completed (which some studies do), the researchers were clearly interested in the relationship between student achievement and amount of homework as measured by time. In addition, the sentence Kohn quotes from page 28 of the original research article, which he asserts summarizes the main conclusions of the authors, does not in fact reflect their overall conclusions. Again, if one looks only as far as the researchers’ abstract to the article, Gorges and Elliott make the following statement: “Homework time and helping time were found to be predictive of academic performance across grade levels, especially for the grade 3 group.”⁹

More specific examples of the researchers’ conclusions are provided in the body of the article itself. For the survey portion of the study the researchers report the following:

Third-graders’ time spent on math homework, combined with parent time spent on spelling, accounted for a significant portion of the variance in students’ . . . AC scores. . . . On the whole, student time variables (total, math, spelling) . . . explain a majority of the variance in . . . AC scores. . . . Grade 3 parents’ helping time across subject areas . . . was found to significantly predict students’ math performance. . . . Similar results were produced with respect to math percent correct.¹⁰

Gorges and Elliot report similar findings for the log portion of the study: “As expected, grade 3 students’

time spent on math and spelling homework strongly predicted their overall academic competence.”¹¹

In summary, to characterize this study as offering no support for the hypothesis that homework can be

.13 between the proportion of homework completed and student grades.¹³ This was significant at the .02 level. In very general terms, a standardized regression weight can be thought of as a correlation that controls

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beneficial at lower grade levels, one has to ignore the direct statements of the researchers and their reported findings.

A second study we cited was a 1998 publication by Harris Cooper and colleagues, titled “Relationships Among Attitudes About Homework, Amount of Homework Assigned and Completed, and Student Achievement.”¹² Kohn states that this study “looked at students of different ages but found no positive effect for the younger children — only a negative effect on their attitudes” (p. 16). We discuss this study briefly here and in more depth later because it is one that Kohn uses as primary support for his allegation that research indicates that homework has no positive effect on student achievement in the lower grades.

The study involved some 285 students in grades 2 and 4 (lower grades) and about 424 students in grades 6, 8, 10, and 12, with a few students in grades 7 and 11 (upper grades). Homework questionnaires were administered to teachers, parents, and students and sought their perceptions regarding the amount of homework assigned, the time spent on homework, and the proportion of homework completed. Teachers responded only to questions regarding the amount of homework assigned, because they could not comment on the other two elements. Student achievement was measured using grades and achievement tests regularly scheduled in the district. For the purposes of this discussion, we consider the findings at the lower grades only.

Very different patterns of responses were observed between teachers, parents, and students. Of the three measures of homework, the proportion of homework completed as reported by parents demonstrated some strong positive relationships with student achievement. Using a structural equation model that controlled for factors such as standardized test scores, parent attitudes, teacher attitudes, amount of homework assigned by the teacher, and student attitudes, the researchers computed a standardized regression weight (i.e., beta weight) of

for a number of other variables (in this case, standardized test scores, parent attitudes, and so on). The researchers summarize their findings as follows:

In the past, some educational leaders have recommended that homework be abandoned for young children because the evidence has shown no relationship between the amount of homework a child does and achievement. . . . Our results suggest that the benefits of homework for young children may not be immediately evident but exist nonetheless. First, by examining complex models and distinguishing between homework assigned and homework completed, we were able to show that, as early as the second and fourth grades, the frequency of completed homework assignments predicts grades, even when controlling for standardized test differences, amount assigned, and teacher, student, and parent attitudes.¹⁴

Again, we will return to this study later.

A third study we listed was that by Michael Rosenberg.¹⁵ Kohn notes that the study “consisted of exactly six children with learning disabilities in a classroom featuring rigidly scripted lessons. The researcher sought to find out whether sending them home with more worksheets would yield better results on a five-minute test of rote memory. Even under these contrived conditions, the results were mostly negative” (p. 17).

In contrast, Rosenberg reports on two experiments that were tightly controlled (as opposed to contrived) in an attempt to isolate the effects of homework on the mathematics achievement of learning disabled (LD) elementary students. The first study (the one Kohn comments on) involved six students aged 8 to 10. The quality of instruction provided to each student was standardized by scripting the instruction. In effect, the scripting was used to control for extraneous instructional variables (i.e., those variables not directly related to homework) that might influence the results. All students received daily homework assignments and received the

same tests of mathematics facts. At the end of the study, the researcher observed an uneven effect on students' mathematics achievement. For some students, homework produced positive results; for others, it did not.

However, Rosenberg also noticed a relationship between the proportion of homework *completed* and whether or not homework had a positive effect on student achievement. This led him to design a second experiment, which Kohn does not mention in the body of his article. This time, Rosenberg designed and assigned the homework in such a way as to ensure high completion rates for students. His subjects were four different LD elementary students. As predicted, homework was found to have a positive effect on mathematics achievement. About these two studies Rosenberg comments:

Taken together, the results of the two studies indicate that homework, when planned, assigned, and implemented in a structured and responsible manner, can be successful in maximizing the effectiveness of direct instruction sequences with students diagnosed as LD. Clearly, supplemental homework can serve as a vehicle for additional practice opportunities and thus provide an additional source of learning time for the important practice component in direct instruction sequences.¹⁶

It is noteworthy that Kohn does not mention the second study or its findings in the body of the article, because it was the second study that allowed the researcher to isolate and test an important aspect of effective homework — the completion rate for homework assignments. However, Kohn does mention this second study in a footnote to his article in which he dismisses the positive results, saying that students and parents had been “pressed to follow his [the researcher’s] instructions to the letter” (n. 37, p. 21).

A fourth study we listed was that by Thomas Good, Douglas Grouws, and Howard Ebmeier.¹⁷ About this Kohn notes that it

listed a number of practices employed by teachers whose students scored well on standardized tests. Among them was a tendency to assign more homework than their colleagues, but the researchers made no attempt to determine what contribution, if any, was made by the homework; in fact, they cautioned that other, unnamed factors might have been more significant than any of those on the list. (pp. 16-17)

This study was what is sometimes referred to as an “outlier” study. In other words, it attempted to identify a set of “effective” teachers and a set of “ineffective”

teachers and then examine what they do differently. The assumption underlying this design is that the differences in behavior between the groups will provide insight into effective instructional practices. In this case, effective teachers were operationally defined as those whose students exhibited consistently high scores on a standardized test of mathematics for a two-year period of time.

Out of 100 third- and fourth-grade teachers who were originally candidates for the study, 18 were identified: “nine fourth-grade teachers who were relatively effective and stable on total math residual scores across two consecutive years (that is, they were in the top third of the sample across two years) and nine fourth-grade teachers who were relatively ineffective and stable for two consecutive years.”¹⁸ The use of residual scores means that the researchers statistically adjusted for what students already knew about mathematics prior to being placed in the teacher’s class. This allows for a better measure of the actual impact teachers had on student learning. These nine “high-achieving” and “low-achieving” teachers were then systematically observed over a three-month period. The detailed observations were designed to identify the differential practices employed by high- versus low-achieving teachers.

Among other differences in practices, the researchers found that

highs demanded more work and achievement from students. . . . For example, high teachers assigned homework more frequently than lows. . . . Although less effective teachers spent more class time discussing homework, observers’ logs indicated that effective teachers assigned homework more frequently than less effective teachers (48% vs. 38%).¹⁹

Overall conclusions from this study included the following: “We are pleased that it was possible to isolate patterns of instructional behavior which were associated with student achievement. However, we are well aware of the possibility that many factors other than the behaviors we had observed in high-achievement classrooms might be responsible for the higher achievement of students.”²⁰ Though Kohn quoted the researchers’ comment about being aware of the possibility of other factors producing higher student achievement, he did not quote the immediately preceding sentence, in which the researchers stated their pleasure at being able to isolate patterns of instructional behavior associated with student achievement.

At this point it is useful to reexamine Kohn’s comment about the studies we listed as offering support for

the positive effects of homework at the elementary level. Again, Kohn charged that “none of them offered any support.” As evidenced in the discussion above, to make this claim one must dismiss the findings of those studies as reported by the researchers themselves. In fact, every one of the studies we’ve mentioned here provides support for the use of homework at the elementary level, albeit with different levels of surety, clarity, and generalizability.

The final study we cited was a 1999 publication by Cooper and his colleagues.²¹ And Kohn is correct in his observation that this study does not focus on elementary students; rather, it involves students in grades 6 through 12. In fact, it should not have been included in the set of studies that we asserted supported homework at the elementary level. In retrospect, we have no explanation for how it was included on the list. Kohn’s interpretation is that we were trying to misrepresent the research. We assure readers that this was not the case and apologize for our careless error. Our book was completed in 2000 and published in 2001. Therefore, the document is almost six years old, and it is difficult to reconstruct how this study was included in that particular list of references. To be sure, we intended to use it as a reference in the book, but not where it eventually ended up.

While searching through our archives, we also found another error — a study that should have been included in the list of those supporting the potential positive effects of homework on elementary students: namely, the study by Stacy Townsend that employed a homework-versus-no-homework design with third-graders.²² The effect size for homework on vocabulary learning was .71, which translates into a gain of 26 percentile points. We have no explanation as to why the study by Cooper and his colleagues was listed inappropriately or why the study by Townsend never appeared in the book. Again, our apologies to readers and to Kohn.

To put the discussion of errors in synthesis reports on homework (or any other topic) in perspective, it is useful to note that our book, *Classroom Instruction That Works*, contains 290 citations in its reference section, 187 effect sizes, 187 related percentile gains, and 187 reported sample sizes. This does not include the citations found in the body of book. With large information sets, errors in reporting are not uncommon. To illustrate, in 1978, Robert Rosenthal wrote an article titled “How Often Are Numbers Wrong?” which was published in the *American Psychologist*. He examined 21 studies across a variety of research topics and found that the average percentage of errors (in this case cod-

ing errors) was about 1%, and the highest percentage was 4.2%. If our book follows this pattern, then there are at least another 7.5 errors to be found in our text, and if our book is at the high end of the scale, then there are another 34.7 errors lurking somewhere. Interestingly, one of Rosenthal’s conclusions was: “Getting *all* the errors out is probably not possible nor even desirable from a cost-benefit perspective.”²³ Again, our comments here are intended not to excuse our mistake but only to offer evidence that it was not our intention to mislead or misrepresent. In effect, all researchers and writers probably have a number of careless errors in their published works.

Kohn himself is not immune to this tendency. For example, he inaccurately reports the number of positive correlations in Cooper’s elementary study (see discussion below and Kohn, p. 14). In addition to these understandable and inconsequential errors, Kohn exhibits a tendency toward a different type of error that is not so inconsequential. Perhaps this is best illustrated by examining the elementary study by Cooper and his colleagues in more depth.

Recall that the study involved lower-grade (2 and 4) and upper-grade (6-12) students. Kohn’s comments about the study and the actual results of the study are contrasted in Table 1.

As Kohn describes this study, the researchers used grades and standardized test scores to measure achievement. This is accurate. However, he also states that they “looked at how much homework was assigned by the teacher as well as how much time students spent on it. Thus there were eight separate results to be reported” (p. 14). About these eight separate results, Kohn notes that “the only positive correlation — and it wasn’t a large one ($r = .17$) — was between how much homework older students actually did and their achievement as measured by grades” (pp. 14-15).

The findings Kohn refers to are reported in Table 3 of the study.²⁴ As shown in Table 1 of this article, there were far more than eight separate results reported. In addition, Kohn’s characterization of the general findings is seriously flawed. Perhaps his biggest omission is that he does not report the results for the effects on grades and test scores of the proportion of homework completed. He also reports only the perceptions of students and ignores those of parents. Had he used parent data and the proportion of homework completed, he would have reported a very different trend.

As shown in Table 1, for both students and parents the correlations between grades and test scores and proportion of homework completed were positive, ranging

TABLE 1.

Summary of Kohn's Comments Versus Actual Results of Cooper's 1998 Study

	Variable Regarding Homework	Kohn's Comments	Teacher Rating	Student Rating	Parent Rating
Lower Grades (2 and 4)	Effect on grades of amount of homework assigned	No significant relationship	.19	-.22†	-.22†
	Effect on test scores of amount of homework assigned	No significant relationship	.12	-.04	-.12*
	Effect on grades of time spent on homework [Kohn refers to as amount of homework done]	Negative relationship		-.19**	-.13*
	Effect on test scores of time spent on homework [Kohn refers to as amount of homework done]	No significant relationship		-.04	-.06
	Effect on grades of proportion of homework completed	No comment		.10	.31††
	Effect on test scores of proportion of homework completed	No comment		.07	.22†
Upper Grades (6-12)	Effect on grades of amount of homework assigned	No significant relationship	-.09	.05	.12*
	Effect on test scores of amount of homework assigned	No significant relationship	-.27	-.05	.03
	Effect on grades of time spent on homework [Kohn refers to as amount of homework done]	Positive relationship		.17**	.24††
	Effect on test scores of time spent on homework [Kohn refers to as amount of homework done]	No significant relationship		.00	.14**
	Effect on grades of proportion of homework completed	No comment		.31††	.36††
	Effect on test scores of proportion of homework completed	No comment		.14*	.26†
*p<.05 **p<.01 †p<.001 ††p<.0001					

between .07 and .36. For student ratings at the lower grades, these positive correlations were not significant, but for parent ratings at the lower grades, the correlations were statistically significant. At the upper grades the correlations for student and parent ratings were all statistically significant. This is the pattern Cooper and his colleagues saw as evidence to support the utility of homework at the elementary level. Stated differently, their research did not support nor did they conclude that simply assigning homework at any grade level enhances student achievement. In fact, given the current research summarized in a recent meta-analysis by Cooper and his colleagues, no educational researcher or translator of educational research supports the idea that homework in itself positively affects student achievement.²⁵ However, the research does support the generalization that homework properly designed and assigned in such

a way that it increases the proportion of homework completed by students has a positive effect on student achievement. It was this qualified perspective that allowed Cooper and colleagues to conclude the following as a result of their newer meta-analysis of research from 1987 to 2003:

With only rare exceptions, the relationship between the amount of homework students do and their achievement outcomes was found to be positive and statistically significant. Therefore, we think it would not be imprudent, based on the evidence in hand, to conclude that doing homework causes improved academic achievement.²⁶

In effect, if Kohn is trying to win a battle regarding massive amounts of homework for homework's sake, he has already won. Indeed, he has no opponents we

are aware of in the world of educational research. From his 2006 article in the *Kappan* and from his new book on the topic, *The Homework Myth: Why Our Kids Get Too Much of a Bad Thing*, it appears that he is not aware of or is not willing to address the distinction between proportion of homework completed and amount of homework assigned. Moreover, in both the *Kappan* article and his book, it appears that he has another agenda: to discredit educational researchers and translators of research (such as ourselves). He also seems to have a disturbing tendency to ascribe very negative motives and intentions to this group. This is shown by the hypothetical monologue that begins his *Kappan* article. It is also shown in his assertion that we were trying to misrepresent the research in our comments in *Classroom Instruction That Works*.

What is one left with after examining the research on homework and Kohn's commentary on that research? First, the research on homework supports its use even at the elementary level, but it does not support its improper use. Homework must be structured in a way that students can accomplish it with relatively high success rates, so that they will complete all or large portions of the homework. This is not a simple or straightforward task. We can hope that, in the near future, research will bring into sharper focus exactly what the characteristics of effective homework are.

In the meantime, educators can and should continue to assign homework, but they should do so in a manner that is well thought out and produces discernible results in student achievement. In the absence of these characteristics, homework should not be assigned simply as a matter of routine.

Second, contrary interpretations of the research on homework should be welcome in the public forum and in education journals. However, opinions and support for those interpretations should be stated in a manner that is respectful to all parties concerned and does not ascribe the worst of intentions to those who disagree with a specific position.

1. Robert J. Marzano, Debra J. Pickering, and Jane E. Pollock, *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement* (Alexandria, Va.: Association for Supervision and Curriculum Development, 2001).

2. *Ibid.*, p. 8.

3. Harris Cooper, *Homework* (White Plains, N.Y.: Longman, 1989).

4. *Ibid.*, p. 71.

5. Harris Cooper, "Synthesis of Research on Homework," *Educational Leadership*, November 1989, p. 90.

6. Marzano, Pickering, and Pollock, p. 62.

7. Todd C. Gorges and Stephen N. Elliott, "Homework: Parent and

Student Involvement and Their Effects on Academic Performance," *Canadian Journal of School Psychology*, vol. 11, 1995, pp. 18-31.

8. *Ibid.*, p. 18.

9. *Ibid.*

10. *Ibid.*, p. 23.

11. *Ibid.*, p. 25.

12. Harris Cooper et al., "Relationships Among Attitudes About Homework, Amount of Homework Assigned and Completed, and Student Achievement," *Journal of Educational Psychology*, vol. 90, 1998, pp. 70-83.

13. *Ibid.*, Figure 1a, p. 79.

14. *Ibid.*, p. 82.

15. Michael S. Rosenberg, "The Effects of Daily Homework Assignments on the Acquisition of Basic Skills by Students with Learning Disabilities," *Journal of Learning Disabilities*, vol. 22, 1989, pp. 314-23.

16. *Ibid.*, pp. 322-23.

17. Thomas L. Good, Douglas A. Grouws, and Howard Ebmeier, *Active Mathematics Teaching* (New York: Longman, 1983).

18. *Ibid.*, p. 19.

19. *Ibid.*, p. 22.

20. *Ibid.*, p. 29.

21. Harris Cooper et al., "Relationships Between Five After-School Activities and Academic Achievement," *Journal of Educational Psychology*, vol. 91, 1999, pp. 369-78.

22. Stacy Townsend, "The Effects of Vocabulary Homework on Third-Grade Achievement," Kean College of New Jersey, 1995, ERIC ED 379 643.

23. Robert Rosenthal, "How Often Are Our Numbers Wrong?," *American Psychologist*, vol. 33, 1978, p. 1007.

24. Cooper et al., "Relationships Among Attitudes," Table 3, p. 77.

25. Harris Cooper, Jorgianne C. Robinson, and Erika A. Patall, "Does Homework Improve Academic Achievement? A Synthesis of Research, 1987-2003," *Review of Educational Research*, vol. 76, 2006, pp. 1-62.

26. *Ibid.*, p. 48. 

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