

Experiments in Tutoring Children for Reading and Math Literacy¹

Orsolya Lorincz and Kathleen Bloom
The University of Western Ontario and the University of Waterloo

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Volunteer tutoring is seen as a valuable adjunct to classroom instruction for children who fall behind normative achievement levels in essential literacy skills. A systematic review of the academic research studies of volunteer tutoring for children in Grades 1-6 was undertaken: (a) to describe the nature and methodological landscape of published studies; (b) to identify common features of tutoring procedures; and (c) to summarize evidence of the efficacy of tutoring. Claims of causal relationships between tutoring and improved literacy require at minimum the comparison of children who experienced tutoring with children who did not. For the present report we drew, from the results of an exhaustive search of published research, those studies that set claims of tutoring efficacy against the skills of control or comparison groups of children. This report represents an interim survey and summary of the results of those studies.

The Database of Tutoring Research Citations

Articles summarized in the present report were selected from a citation database that was created using standard and rigorous methods of systematic research review developed by the Cochrane and Campbell Collaborations.

1. A Review Team was assembled from representatives of Research Works! for child literacy including those from Frontier College and the Policy and Program Branch of the Ontario Ministry of Education. A graduate student (O.L.) was employed to lead the review.
2. The Review Team formulated the question: ***Is one-to-one volunteer tutoring effective in increasing reading and math literacy of elementary-school children?***
3. The Review Team reviewed and approved key concepts for searching citation databases including:
 - reading and mathematics literacy
 - outcomes of academic achievements and attitudes
 - volunteer as unpaid tutors who were not employed teachers
 - children in Grades 1-6
 - articles written in English by researchers in industrialized nations
 - articles published in 1980 and thereafter
4. Keyword search strategies were developed and used for the following citation databases: *ERIC, PsychInfo, Linguistics & Language Behavior Abstracts, Social Services Abstracts, Sociological Abstracts, MLA International Bibliography; Web of Science, PAIS International*
5. Retrieved citations were imported to RefWork™ and duplicates were removed to create a database of 393 titles and abstracts

¹The views expressed in this report are those of the authors.
For more information contact: Dr Kathleen Bloom, kbloom@research-works.ca.

6. The Review Team considered and approved inclusion criteria which, in addition to search strategy criteria listed above, included:

only typically developing children
excluding physical, emotional, behavioural, and cognitive disabilities and gifted children

cross-aged tutors
excluding peers or children younger than high-school age, employed teachers, electronic learning

Reading, math, writing, vocabulary, academic, other cognitive achievements
excluding studies in which only social-psychological were measured

7. Inclusion/exclusion criteria were applied to the 393 citation titles and abstracts resulting in the retention of 134 citations. The application of criteria was reliable as measured by the high rate of agreement between two reviewers.

8. Of the 134 citations included on the basis of title and abstract, 128 full text articles were able to be retrieved. When inclusion/exclusion criteria were applied to the full text of the articles, 57 were retained.

Identifying the Experiments

Evidentiary conclusions can be drawn best from research studies that employ sound methods. Those methods include, at a minimum, reporting that is clear and complete, data that are observed or measured in a reliable manner, and analyses appropriate to the level of data. To say that an intervention “works,” the research must be designed as an experiment by including a *control or comparison group* on which the effects of the intervention can be weighed. A control or comparison group is assembled and treated identically to the intervention group except that the intervention is either not implemented at all, or is implemented in a different manner. Comparison groups are those in which participants are matched in demographic features to those in an already assembled intervention group. Although data from experiments that employ comparison groups are of research value, sometimes the matching process exerts unknown or undue influence on the outcome data. For this reason research methodologists advocate, when possible, that participants in an experiment be assigned at random to either the group that will receive the intervention or the group (control group) that will provide the comparison of outcomes. The jargon term for the design of such experiments is *Randomized Controlled Trials* or RCTs.

The 57 articles that met the inclusion/exclusion criteria based on the information gleaned from their texts were read again to determine whether the studies were experiments that included either comparison or control groups. We found 31 articles that had no such groups. Many of those articles contained studies of single samples of children who had been assessed before and then after tutoring interventions. The results of those studies are of interest and will be described in the final report of our systematic review. We found four articles from one laboratory that were not described sufficiently for us to determine the origin of the data sets. We could not be certain whether the data contained overlapping samples or independent samples across the articles. A fifth article, the first publication in what appeared to be a set of studies from this group of researchers, was retained. In all 22 of the 57 articles were identified as experiments. Of these, 14 (64%) were RCTs. This percentage is substantial in the context of research in the fields of education and the social sciences.

The Landscape of Experiments

Characteristics of the learner, tutor, procedure, and results of each study were captured in a Summary Data Extraction spreadsheet (attached). The spreadsheet allowed us to more easily view the landscape of the 22 studies: Who were the participants? How and by whom were the children tutored? How were the effects of tutoring assessed? The 22 studies can be divided into two categories, those for which parents were the tutors and those for which volunteers, unrelated to the children, were tutors. Two articles² each contained one study of parents and one study of volunteers as tutors. These studies were treated as separate entries in the spreadsheet, and thus the total number of studies was 24.

² Butler (1991); Morris, Shaw, & Perney (1990)

The Tutors

Parents were tutors in 11 studies and all but one took place at home
Volunteers were tutors in 13 studies and all but one took place at school

The Learners

Most studies that reported school grade (21) included children in the first 3 Grades of school
Most studies that reported socioeconomic status (15) included children with low SES backgrounds

The Tutoring Procedures

Tutors received training in 16 of the 20 studies that reported tutor preparation procedures
In more than half of the studies (14), tutors followed a defined structured set of tutoring procedures
Most of the studies (14) implemented tutoring for a period longer than 4 months

Measures of Effects of Tutoring

The majority of studies (16) assessed level of reading skills; some of these studies reported assessments of reading fluency and/or reading comprehension. Eight studies reported assessments of reading fluency and/or reading comprehension only. In other words, all studies included some assessment of reading proficiency. Few studies included assessments of spelling (5), grammar (1), writing (2) or mathematics skills (4). Few studies included assessments of children's attitudes toward reading and/or school (4). Only 2 studies (both with parents as tutors) evaluated long-term effects. Assessments were made 8-9 months following tutoring. Neither study found significant long-term effects.

What the Research Says about Tutoring

Independently of whether parents or volunteers served as tutors, whether or not tutors were trained, whether or not tutoring followed a structured program, and independently of the length of tutoring, the school grade level or SES background of the children, all but one study found statistically significant improvements in reading skills as the result of tutoring. The promise of tutoring that these studies offer is strengthened by the fact that all studies met the standards of good research by weighing the results of tutoring against matched comparison groups or randomized control groups. On the other hand, no study offered evidence, and only two studies even evaluated, long-term, sustainable effects of tutoring. Also, the high percentage of studies showing positive effects of tutoring must be considered in the context of cultural biases against the publication of research that fails to show significant effects of interventions. That being said, we feel that there is much to recommend the use of tutoring as an adjunct to teaching children who are struggling in the first years of elementary school. But what tutoring procedures can we recommend based on our review of the experiments?

It is impossible to say with certainty what characteristics of tutoring are more successful than others. All but two studies tested tutoring against no tutoring and not against other forms of tutoring. Instead, we can only highlight the elements of tutoring procedures contained in the studies, and then assume that one or more of these elements was responsible at least in part for the success of tutoring. The elements of tutoring procedures can be described as sessions in which:

the tutor reading to child as a "warm up"
the tutor and child reading in unison
the child reading to Tutor
the tutor and child discussing the material read

Procedures also include:

ascertaining the child's mastery of a skill or task before advancing to the next level of performance
encouragement as well as praise and rewards for mastery

We also suggest that researchers be encouraged to conduct direct tests of tutoring methods, to determine efficiency and generality of tutoring for reading literacy, and to increase their efforts to identify the best methods of tutoring for math literacy. All of our suggestions relate only to information we found in the 22 articles reviewed for this interim report, and are preliminary to the final report of our systematic review.

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Room 3269 PAS
200 University Avenue West
Waterloo ON N2L 3G1
Tel. 519.888.4009
kbloom@research-works.ca
www.research-works.ca