

Technical Appendix

Definition

Peer tutoring includes a range of approaches in which learners work in pairs or small groups to provide explicit teaching support. There are two main types of peer tutoring: same age and cross age. In cross-age peer tutoring, an older learner takes the tutoring role and is paired with a younger tutee or tutees. There are also a number of same-age approaches such as Reciprocal Teaching, where learners alternate between the role of tutor and tutee, and Peer-Assisted Learning. The common characteristic of all these approaches is that learners take on responsibility for aspects of teaching and for evaluating the success of their peer or peers.

In most peer tutoring approaches learners are instructed in how to undertake their roles effectively, often using specific and structured aspects of an interaction (such as learning the question types in reciprocal peer tutoring, or using specific prompts and questions in cross-age peer tutoring).

Peer assessment involves learners of the same or different ages providing feedback to peers relating to aspects of their academic performance and can have different forms such as reinforcing or correcting aspects of learning. Where this includes a teaching role to support the learner being assessed to act on such feedback, studies are to be included as peer tutoring. If peer assessment is undertaken purely as marking, particularly if the aim is to develop the assessor's understanding of the marking criteria, without support to improve, it would not be included.

Peer tutoring is related to a number of other Toolkit strands. It is sometimes thought of as a form of collaborative learning, and part of a broader range of strategies sometimes described as peer-mediated learning. However, in the Toolkit we consider collaborative activities (and co-operative learning) as activities where the learners have a common aim or goal. This might be a co-operative task where group members do different aspects of the task but contribute to a common overall outcome (such as taking responsibility for different aspects of a presentation), or a shared task where group members work together throughout the activity (such as writing a joint article or report). In peer tutoring, by contrast, there is an explicit teaching and evaluation role.

There are also similarities with meta-cognitive approaches. The tutor is often thought to improve due to the development of their meta-cognitive awareness and improvement in their capability to self-regulate their own learning. This is usually implicit however, and can therefore be distinguished from the teaching and application of meta-cognitive and self-regulation strategies. In Peer tutoring, tutees are provided with direct feedback about what they are learning from their tutor; this is an integral component of the approach.

Search terms: Peer tutoring; peer assisted learning, peer teaching, peer instruction, peer help, peer buddy, peer involvement, PALS, reciprocal tutoring, reciprocal teaching

Evidence Rating

Overall the evidence is rated as extensive. There are nine meta-analyses included in the summary, with four of these conducted in last 10 years. The pooled effects from these syntheses range from 0.33 to 1.05 (a range of nearly three quarters of a standard deviation), so do not provide a consistent estimate of effect. This variation is not consistently explained by the varying focus of the studies or by other moderator analyses. A number of the meta-analyses include some experimental and quasi-experimental studies which are not well controlled. In addition, not all effects have been adjusted appropriately for clustering. Recent single studies have not replicated these meta-analytic effects.

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(2016)

Summary of effects

Meta-analyses	Effect size	FSM effect size	
Cohen, P.A., Kulik, J.A., Kulik, C.C., (1982)	0.40	-	(On tutees)
	0.33	-	(On tutors)
Cook, S. B., Scruggs, T. E., Mastropieri, M. A., & Casto, G. C.I, (1985)	0.65	-	(On tutees)
	0.59	-	(On tutors)
Ginsburg-Block, M.D., & Rohrbeck, C.A., (2006)	0.35	0.38	
Jun, S.W., Ramirez, G., & Cumming, A, (2010)	1.05	-	(Cross age peer tutoring)
Kunsch, C.A., Jitendra, A.K., Sood, S. , (2007)	0.47	-	(SEN)
Leung, K. C., (2014)	0.47	0.35	
Rohrbeck, C., Ginsburg-Block, M.D., Fantuzzo, J. W. & Miller, T.R., (2003)	0.59	0.32	
Washington State Institute for Public Policy, (2014)	0.43	-	
Zeneli, M., Thurston, A., & Roseth, C., (2016)	0.51	-	
Single Studies	Effect size	FSM effect size	
Lloyd, C., Edovald, T., Kiss, Z., Skipp, A., Morris, S., & Ahmed, H. (2015b)	-0.02	-0.04	(Cross age on tutees Y7)
	-0.06	-0.06	(Cross age on tutors Y9)
Lloyd, C., Morris, S., Edovald, T., Skipp, A., Kiss, Z., & Haywood, S. (2015a)	0.01	-0.05	(Cross age on tutees Y3)
	0.02	0.05	(Cross age on tutors Y5)
Spörer, N., & Brunstein, J. C. (2009)	0.51	-	
What Works Clearinghouse (2013)	0.06	-	
Effect size (weighted mean)	0.37		

The right hand column provides detail on the specific outcome measures or, in brackets, details of the intervention or control group.

Meta-analyses abstracts

1 Cohen, P.A., Kulik, J.A., Kulik, C.C. (1982)

A meta-analysis of findings from 65 independent evaluations of school tutoring programs showed that these programs have positive effects on the academic performance and attitudes of those who receive tutoring. Tutored students outperformed control students on examinations, and they also developed positive attitudes toward the subject matter covered in the tutorial programs. The meta-analysis also showed that tutoring programs have positive effects on children who serve as tutors. Like the children they helped, the tutors gained a better understanding of and developed more positive attitudes toward the subject matter covered in the tutorial program. Participation in tutoring programs had little or no effect, however, on the self-esteem of tutors and tutees.

2 Cook, S. B., Scruggs, T. E., Mastropieri, M. A., & Casto, G. C.I (1985)

A meta-analysis was conducted on available research documenting effectiveness of handicapped students as tutors of other students. Nineteen articles yielding 74 effect sizes were located. Results indicated that (a) tutoring programs were generally effective; (b) tutees generally gained more than tutors; and (c) tutor and tutee gains on self-concept and sociometric ratings were small, while gains on attitude measures were larger. Implications for instruction and further research are given.

3 *Ginsburg-Block, M.D., & Rohrbeck, C.A. (2006)*

Meta-analysis was used to examine social, self-concept, and behavioral effects of peer-assisted learning (PAL) interventions with elementary school students. An electronic search of PsycINFO and ERIC databases resulted in 36 relevant PAL studies. Overall, effect sizes were small to moderate across the 3 outcome variable domains. Both social and self-concept outcomes were positively correlated with academic outcomes. Specific PAL components—student autonomy, individualized evaluation, structured student roles, interdependent group rewards, and same-gender grouping—were related to effect sizes. PAL interventions were more effective for low-income versus higher income, urban versus suburban–rural, minority versus nonminority, and Grades 1–3 students versus Grades 4–6 students. Results suggest that PAL interventions that focus on academics can also improve social and self-concept outcomes.

4 *Jun, S.W., Ramirez, G., & Cumming, A (2010)*

What does research reveal about tutoring adolescents in literacy? We conducted a meta-analysis, identifying 152 published studies, of which 12 met rigorous inclusion criteria. We analyzed the 12 studies for the effects of tutoring according to the type, focus, and amount of tutoring; the number, age, and language background of students; and the quality of the research. Despite variability, these studies suggest benefits, notably for cross-age tutoring, reading, and small tutoring programs of lengthy duration.

5 *Kunsch, C.A., Jitendra, A.K., Sood, S. (2007)*

The purpose of this synthesis is to summarize the effectiveness of peer-mediated interventions on the mathematics performance of both students with disabilities and those at risk for mathematics disabilities. Meta-analytic techniques were used to calculate mean effect sizes for 17 studies that met inclusion criteria. Results indicate that peer-mediated interventions in mathematics are moderately effective for improving students' mathematics performance. Also, findings are strongest for students at risk for mathematics disabilities, elementary-aged participants, and mathematics computation content. Recommendations for future research and practical implications are discussed.

6 *Leung, K. C. (2014)*

Previous meta-analyses of the effects of peer tutoring on academic achievement have been plagued with theoretical and methodological flaws. Specifically, these studies have not adopted both fixed and mixed effects models for analyzing the effect size; they have not evaluated the moderating effect of some commonly used parameters, such as comparing same-age reciprocal peer tutoring, same-age nonreciprocal, or cross-age peer tutoring; considered the educational level of tutee or tutor; or properly addressed publication bias. Most studies are confined to specific populations and particular subjects (mainly mathematics and reading), and some studies are confounded by other types of intervention (such as cooperative learning or adult-led tutoring). Hence, there is a compelling need for an updated, comprehensive meta-analysis evaluating the effect of peer tutoring on academic achievement that incorporates advances in methodology, is not confounded by other modes of peer learning, and engages a wide range of participants and various subjects. The present study demonstrates that peer tutoring has a positive impact on academic achievement. The moderators and crucial determinants of the effectiveness of peer tutoring are identified and compared. Moreover, program parameters based on the concepts of role theory and interdependent group contingencies are evaluated. Finally, a preliminary empirical model of the crucial determinants of best practices for peer tutoring on academic achievement is proposed.

9 *Rohrbeck, C., Ginsburg-Block, M.D., Fantuzzo, J. W. & Miller, T.R. (2003)*

A meta-analytic review of group comparison design studies evaluating peer-assisted learning (PAL) interventions with elementary school students produced positive effect sizes (ESs) indicating increases in achievement (un-weighted mean ES = 0.59, SD = 0.90; weighted ES, $d = 0.33$, $p < .0001$, 95% confidence interval = 0.29–0.37). PAL interventions were most effective with younger, urban, low income, and minority students. Interventions that used interdependent reward contingencies, ipsative evaluation procedures, and provided students with more autonomy had higher ESs. Adequate descriptive information was missing in many studies. Researchers are encouraged to develop PAL interventions in collaboration with practitioners to maximize those interventions' use and effectiveness and to include more detailed information about students, schools, and intervention components in their reports.

15 *Washington State Institute for Public Policy (2014)*

Generally, peer tutoring is an instructional strategy that uses students to provide academic assistance to struggling peers. Peer tutoring may use students from the same classrooms or pair older students with younger struggling students. Tutoring assistance can occur through one-on-one interactions or in small groups and in some instances students alternate between the role of tutor and tutee. The specific types of peer tutoring that have been evaluated and are included in this meta-analysis are (in no particular order): ClassWide Peer Tutoring, Peer-Assisted Learning Strategies, and Reciprocal Peer Tutoring. The evaluated tutoring programs in this analysis provide, on average, about 30 hours of peer tutoring time each year and about 6 hours of training time for teachers and students to learn program procedures.

17 *Zeneli, M., Thurston, A., & Roseth, C. (2016)*

A meta-analysis was undertaken on a form of cooperative learning, peer tutoring. The effects of experimental design on outcomes were explored, as measured by Effect Size (ES). Forty one articles with 49 studies were included in the meta-analysis. ES were positive for peer tutoring with highest effects in elementary, reciprocal role tutoring conducted with low socio-economic class students with high ethnic minorities. ES was influenced by experimental design including design, matching of population samples at pre-test and selection of attainment measures. The implications for future meta-analyses and educational research design in peer tutoring and more broadly are explored.