This research explored the effect that interviews and the presence of an adult ‘helper’ had on novice algebra students’ work solving linear equations. 84 students participated, one hour each day, in a weeklong summer ‘camp’ before entering seventh grade. On the first day, they completed a pretest and were introduced to four operations to solve algebraic equations (adding/subtracting to both sides, dividing both sides, distributing, and combining like terms). Students spent three days working through linear equations before completing a posttest on the last day. Of the 84 students, 23 were randomly selected to work individually beside an interviewer. These students performed similarly on several pretest measures as non-interview students. For each interview student, an adult prompted the student to explain his/her work, reasoning, and strategies before or after solving selected problems. The adult did not provide assistance in completing problems but supplied encouragement and prodding (“What do you think you should do next?” “Nice work!”). The other students worked individually on the problems, were not interviewed, and were essentially provided no feedback as they worked.

The literature is clear on how the presence of an adult helper, even one who does not provide explicit help but merely words of encouragement, impacts student learning. Studies have documented the positive effect an adult helper can have in one-on-one learning situations (e.g., Bloom, 1984). In addition, the self-explanation literature (e.g., Chi, Bassok, Lewis, Reimann, & Glaser, 1989) suggests that students who are asked to verbalize or explain their problem-solving steps are more likely to develop deeper knowledge. Even when students are not self-explaining but merely describing the reasons behind their choice of strategies, beneficial effects have been found (Aleven & Koedinger, 2002; Stinessen, 1985).

However, in this study, students who worked with an adult did not benefit as much as other students. Interview students were less likely to get three of the eight post-test problems correct; a similar, although not significant, trend was observed with the remaining problems. Interview students used more problem-solving steps, and were therefore defined as less efficient, in correctly solving two post-test problems; a similar trend was seen for the other problems. These results raise questions about the benefits of self-explanation and an adult presence. Additional work should explore whether interviews may actually lessen algebra students’ efficiency and their likelihood of solving problems correctly, particularly for novice learners.

References