

# More of Eliza's counts

## Teacher reflection

Eliza has shown that she can use a number of strategies for solving addition and subtraction problems: counting using her fingers, counting on mentally, drawing a picture, TouchMath, and, of course, she can make guesses. When students have experiences in early childhood, how do they build their understanding of number operations, and what strategies do they naturally choose to find out something about numbers in various situations?

I wanted to see the types of strategies Eliza would use without my prompting or modeling them ahead of time. How would she recognize the distinctions among different problem types involving addition and subtraction? With joining problems, result unknown, and compared set, difference unknown, would she automatically recognize differences and adjust her solution method accordingly? For instance, in the first problem, I had asked the following question: "Can you think of another way to find the answer?" Eliza had answered, "I can count on my fingers...three, four, five, six, seven, eight. There are eight tomatoes."

I noticed that Eliza used the counting-on strategy beginning at three rather than starting from one, showing she could conserve the quantity of three. Never in the work session did she start counting from one. In one case, she counted on from the smaller number (3, 5), and in the other, she began with the larger of the two numbers (8, 5); she does not yet consistently determine the most efficient starting place in counting on.

When I gave Eliza the compare question, I was surprised at how quickly she moved to a solution. Unlike the previous questions, she did not automatically guess a random number. She began drawing squares—two for Nola (her sister) and eight for Katja (her best friend). Then, without prompting, she crossed off two

of Katja's squares and told me they "didn't count." She could identify that those matched Nola's total and would not be included in the difference. Her strategy was to use a model to compare the two sets.

Reading comes easily to Eliza, and I suspect that she guessed quickly at first because she felt that an immediate answer was called for. Her guesses for the first two questions, however, were close, and I wonder what mental images or counting strategies she was using before answering. By the third problem, when she intuited that a narrative was required, she moved immediately into drawing and explaining her answer.

It was interesting to me, when examining Eliza's work on joining problems, where at first her strategies may seem to differ, they were actually all a variation of counting on. She is still working on her efficiency in conserving the larger amount, but whether she uses mental computation, her fingers, or TouchMath for a procedural method, the strategy to find the whole involved counting on from one of the parts. When Eliza encounters examples with "start unknown" or "change unknown," what instructional moves might help develop her proficiency to choose among multiple strategies on the basis of the efficiency each strategy might offer? I believe her computational proficiency can be increased by offering a variety of opportunities and activities that investigate number relationships, such as one or two more; one or two less; five frames; ten frames; dot cards; and part-part-whole relationships. As she has multiple experiences investigating the structure of numbers and different combinations that can build numbers, Eliza's confidence and fluency with number relationships can move from advanced counting strategies to using number facts to perform number operations.