*Solving an advanced math problem independently requires the coordination of a number of complex skills. The student must have the capacity to reliably implement the specific steps of a particular problem-solving process, or cognitive strategy. As least as important is that the student must also possess the necessary metacognitive skills to analyze the problem, select an appropriate strategy to solve that problem from an array of possible alternatives, and monitor the problem-solving process to ensure that it is carried out correctly*

*The following strategies combine both cognitive and metacognitive elements. First, the student is taught a 7-step process for attacking a math word problem (cognitive strategy). Second, the instructor trains the student to use a 3-part self-coaching routine for each of the 7 problem-solving steps*

**Cognitive Intervention Steps**

*In the cognitive part of this multi-strategy intervention, the student learns an explicit series of steps to analyze and solve a math problem*

1. **Read the problem.** The student reads the problem carefully, noting and attempting to clear up any areas of uncertainty or confusion (e.g., unknown vocabulary terms)
2. **Paraphrase the problem.** The student restates the problem in his or her own words
3. **‘Draw’ the problem.** The student creates a drawing of the problem, creating a visual representation of the word problem
4. **Create a plan to solve the problem.** The student decides on the best way to solve the problem and develops a plan to do so
5. **Predict/Estimate the answer.** The student estimates or predicts what the answer to the problem will be. The student may compute a quick approximation of the answer, using rounding or other shortcuts
6. **Compute the answer.** The student follows the plan developed earlier to compute the answer to the problem
7. **Check the answer.** The student methodically checks the calculations for each step of the problem. The student also compares the actual answer to the estimated answer calculated in a previous step to ensure that there is a general agreement between the two values

**Metacognitive Component**

*The metacognitive component of the intervention is a 3-part routine that follows a sequence of ‘Say,’ ‘Ask,’ ‘Check.’ For each of the 7 problem-solving steps reviewed above:*

1. The student first self-instructs by stating or ‘saying’ the purpose of the step (**Say**)
2. The student next self-questions by ‘asking’ what he or she intends to do to complete the step (**Ask**)
3. The student concludes the step by self-monitoring or ‘checking’ the successful completion of the step (**Check**)

**Notes**

1. While the Say-Ask-Check sequence is repeated across all 7 problem-solving steps, the actual content of the student self-coaching comments changes across the steps
2. See ‘Say-Ask-Check’ Metacognitive Prompts Tied to a Word-Problem Cognitive Strategy Sheet