**ATME6**

**Instruction-Solve Condition**

List to Bring to Session

Participant List, Schedule

Laptop, power cord

microphone

Mouse (Note: If forget mouse, can use Spacebar instead)

Number pad (Note: If forget number pad, can use keyboard instead)

AAA batteries for digital voice recorder

AA batteries for wireless number pad

Student response packet (midtest, self-reports, PostTests

Working memory recording sheet

Extra Student Assent and Parent Consent forms

Blank paper to use for session notes if needed and to give to student for scratch work

Djgjtal voice recording device

Sheet for recording digital file associated with each participant

Candy (for Posttest)

Pencils

Extension cord & 3-prong adapter

Laptop lock

File folder for putting collected data in

Before the Participant Arrives

Note: You can get ready for next participant while current participant is doing posttest.

1) Look at the schedule and subject log for participant number and assigned condition.

2) Set up webcam and microphone.

1. Double click on the “Camtasia Studio 6” icon on the desktop.
2. Plug in the microphone (rightmost input under the trackpad).
3. Two windows will pop up. In the beige window, click “Device: Mic”. Close the black HD Sound window.
4. In the Camtasia window, look at the leftmost column on the screen (“Task List”). In the “Add” box, click “Record camera…”
5. The webcam should come on. If a “Dell Webcam Central” box pops up, you can close it.
6. Adjust the angle of the screen so that the child’s face will be captured by the webcam.
7. Under “audio,” click “Setup…” and check that the dropdown menu under “audio device” is set to “Microphone/Line In.” Press “Next” and then “Finish.”
8. Press the Start Recording button.
9. You may now minimize the window and run E-prime. When the subject is finished, click “stop recording”. A box will open prompting you to save the file. Save it in the appropriate directory. You are now ready to run the next subject or close the program.

3) Open E-prime program and enter participant’s ID number, grade, and your initials. Be careful not to erase previous data by entering the wrong participant number! Leave screen on “welcome!”

*To run this program: On the desktop, click the ATME6 folder, and then the run file (these have the icon with the purple running man) for the assigned condition (there are 2 total). Click on Build and then Run (or the arrow icon).*

4) Put the participant number on all sheets (student response packet, WM sheet, scrap paper).

5) Record participant number on voice recorder log—you can predict what the audio file will be, so record that too.

5) Put sheet of blank paper in front of computer, so student can show work

6) Set up mouse and number pad.

Note: Actively work with the student throughout the session, reading all information and adding additional prompting.

Note: If you need to exit the Eprime program during the session, you can press CRTL-ALT-SHIFT.

Note: Cap a session at 60 mins. If a student takes 60 mins, let them go regardless of whether they are finished or not. (They may take a few extra minutes to finish up, but not much more than 60 minutes)/

Note: If child seems stressed out, ask him/her if she wants to stop. If a child seems very stressed out, just stop. Ask if they would like a lesson before they go or just want to go back. If want a lesson, ad lib – give some of scripted lesson, and can also tell them how to solve the problems (we’ll drop them anyway!). Give lots of praise (this is rare).

**WELCOME**

**Today we’re going to try to solve some math problems and talk about some math ideas. Before we get started I want you to know I’m here to try to help you and kids like you learn math better by working on some different activities. But first, we’re going to do something a little different.**

**Working Memory Measure: Task 1**

**The Backwards Digit and Letter Span Tasks will be counterbalanced**

[Mouse click to start timer. Screen should be gray]

***I am going to say some numbers/letters, and when I stop I want you to repeat them back to me, but backwards. For example, if I say 8 – 2/Q – B, what would you say?***

* CORRECTLY: If the child response correctly (2 – 8/ B – Q), say: **That’s right.** Proceed to Trial 1.
* INCORRECTLY: If the child responds incorrectly to the sample item, say:

*Letter Span:*

**No, you would say Q – B. I said B – Q, so to say it backward, you would say Q – B. Now try these letters. Remember, you are to say them backward. I – L.**

*Digit Span*:

**No, you would say 2 – 8. I said 8 – 2, so to say it backward, you would say 2 – 8/. Now try these numbers. Remember, you are to say them backward. 5 – 6.**

Whether or not the child response correctly (6 – 5/L – I) to the second sample item proceed to trial 1. Give no help on the second sample item or on any of the test items

Write down their response in the “response” column (next to the numbers to be read).

Read the numbers clearly at a rate of 1 per second.

Do NOT give feedback. If a child wants to know how they’re doing, just tell them they’re doing “fine,” and be generally supportive.

 [Mouse click to end timer. Screen should be blank.]

**INSTRUCTION BLOCK**

**Now, we’re going to think about what the equal sign means and look at a few examples.**

1) **If we look at a problem like this:** (Mouse click)

**3 + 4 = 3 + 4**

**There are two sides to this problem,** (sweep gesture under side) **one on the left side of the equal sign and** (sweep gesture under side) **one on the right side of the equal sign.**

**The first side is 3 + 4** (sweep side).

**The second side is 3 + 4** (sweep side).

**The *equal sign*** (point) **means that the things on both sides of the equal sign are equal or the same** (sweeping hand back and forth). **So the left side of the equal sign always has the same amount as the right side of the equal sign.**

**So what is 3 + 4?** (Point to the left side of the equal sign. Wait for student response)

**The left side of the equal sign is equal to 7.**

**And what is 3 + 4 on the right side?** (Wait for student response)

**The right side of the equal sign is equal to 7, too.**

**We have 7 on this side** (gesture around left) **and 7 on this side** (gesture around right). **Because we get the same amount on both sides, we can say that they are equal. If both sides are not the *same amount*, then they aren’t equal.**

2) **Let’s look at another example. Take a look at this:** (Mouse click)

**4 + 4 = 3 + 5**

**Can you point to the left side of the problem?** (Wait for student to point)

(if ambiguous point, prompt: “**Hm. I couldn’t tell exactly what you were pointing to. Can you show me again more carefully.**”; do this on all problems for ambiguous points)

**The left side is 4 + 4.** *(*sweep gesture)

**Now, please point to the right side.** (Wait for student to point)

**The right side of the equal sign is 3 + 5.**(sweep gesture)

**Remember now, the *equal sign always* says that *both sides* have to equal the *same amount*.**

**So if we have 4 + 4 on the left, how much is on the left side?** (Wait for student response)

**The left side has 8.**

**So how much has to be on the right side?**

**The right side has to be 8!**

**What is 3 + 5?**

 **Right, 8.**

**Both sides have 8 so there should be an equal sign here. If they don’t have the same amount, then the two sides aren’t *equal, and there shouldn’t be an equal sign here*** (point).

3) **So if we look at a problem like this** (mouse click)**:**

**7 = 3 + 4**

**The equal sign still means that both sides are worth the same amount. The *equal sign* always means that the left side has the same amount as the right side. And it means that here, too. What is on the left side?**

**Right, 7.**

**We have 3 + 4 on the right. How much is on the right side?**

**The right side has 7.**

**So, both sides are 7, and the equal sign tells us both sides have the same amount.** (Mouse click)

4) **Now let’s look at something else. For example, if you saw something like this, would it make sense to write an equal sign here?** (Wait for student response.)

**2 + 3 3 + 6**

[If child gives LESS/GREATER response, **Good, that’s right, but right now we’re going to focus on if an EQUAL sign would work here. Would it?**]

**Good** (if say no) / **Actually** (if say yes):

**What does the left side add up to?** (wait for student response)

**Correct, the left side has 5.**

**What does the right side add up to?** (wait for student response)

**Correct, the right side has 9**

**Are they the same amount?** (Wait for student response)

**No, they aren’t. The equal sign means that the left side is the same amount as the right side. Since these are not the same amount, then they are not *equal*, so it would not make sense to write an equal sign here.**

5) **Let’s look at one last problem.** (Mouse click)

**5 + 4 + 3 = 5 + 🞎**

**Can you point to the left side of the problem?** (Wait for student to point)

**The left side is 5+4+3.** (gesture)

**Now, please point to the right side.** (Wait for student to point)

**The right side is *5 +* 🞎** (gesture)

**Again, the *equal* sign means that the left side needs to be *the same amount as* the right side. That means the numbers on this side (gesture) need to add up to the same amount as the numbers on this side (gesture).** (Mouse click; goes to a “ready” screen).

If answer 7, be noncommittal, say “OK” and move on.

**MidTest**

<Mouse click> “Questionnaire” should be at the bottom right corner

Cognitive Load & Retrieval Items:

**Thanks for all your hard work! I’m interested in what you think about the lesson we just went over. There are a few statements that I’ll read through with you.** Hand them the packet.

**On each one, circle the answer that shows how much you disagree or agree with the sentence. Strongly Disagree means that “NO” you disagree a lot with what the sentence says. Disagree means that NO, you disagree with the sentence, but not a lot. Agree means, YES you agree with the sentence, but not a lot. Strongly agree means YES you agree a lot with what the sentence says.**

**When doing the lesson we just went over:**

1. **I had to think hard to do this math work.**

**Do you strongly disagree, disagree, agree, or strongly agree? Circle what you think.**

1. **I was stressed and irritated when I did this math work.**
2. **I thought about other math ideas I have learned before.**
3. **I thought about how the new problems were different from math problems I have done before.**

**Memory Items:**

(If they are holding their pencil, ask them to put it down. Turn the page to the Memory Items and cover the T/F items at the bottom of the page. <Mouse click> The screen should be yellow).

**Next, we’re going to answer a few questions on paper.**

**First, I’d like you to remember a problem for me. I’m going to show you it on the computer for just a few seconds. I don’t want you to solve the problem. Just look at it, and try to remember it. After it goes away, I want you to write the problem exactly as you saw it. Are you ready?**

(press Mouse button when they are ready). 5 + 4 + 8 = 5 + 🞎 appears on the screen for 5s, then the screen turns white again for 20s. After 20s is up, the screen turns yellow. Ask them to finish up. If they finish before 20s is up, you can press Mouse to move on.

**Okay, now we’re going to do one more.** (If needed: **Please put your pencil down). Try to remember this problem, and write it down when it goes away.** (Make sure they’re ready; Mouse click). 9 + 4 + 2 = 🞎 + 5 appears on the screen for 5s then disappears for 20s. When screen turns yellow, ask them to finish up.

Press Mouse button, so that screen turns black. This will time the rest of the Midtest.

True/False:

**Okay, please do the problems at the bottom of the page. I just want you to decide whether each of these number sentences is true. In other words, does it make sense? Circle True, False or Don’t Know.**

a) 5 + 7 = 0

b) 25 + 11 = 11 + 25

c) 3 + 1 = 1 + 1 + 2

Put the packet aside during the solve block.

NOTE: There is no blank screen between the black Midtest timer screen and the first problem of the solve block, so STAY on the black Midtest timer screen until ready for the first problem.

**Solve Block (With SE)**

***\*\*Turn on the digital voice recorder!\*\****

**Next, we’re going to work on some problems on the computer. I want to see how you’re thinking about the kinds of math problems we’re going to work on today. So, I’m not really interested in whether or not you get the right answers; what I really want to see is just how you’re thinking about the problems.**

**If you’d like help adding on the problems, you may use anything that helps. like your fingers** <For all 2nd graders and 3rd graders with a learning disability, add additional tools suggested by teacher>**, a number line, a hundreds chart, or touchmath. I’ll leave them here for you to use if you’d like.**

 **<**have tools available, and customize list to tools teachers at a particular school make available>.

**On the problems, you need to figure out the number that goes in the box to make the number sentence true. Then I’ll ask you some questions.**

1) **Let’s look at the first one.** (Mouse click) **Try to figure out the number that goes in the box to make this number sentence true. Here is some scratch paper to use if you want to. When you have an answer, you can type it with this** (hand them number pad)**, and press Enter.**

 3 + 7 = 🞎

[On mouse click]

[If CORRECT]: **You are right! Your answer was X and the correct answer is 10.** (mouse click)

[If INCORRECT]: **Good try, but your answer was X and the correct answer is 10. Now I’ll put the correct answer in the box.** (Mouse click)

**3 plus 7 equals 10.**

(Mouse click again for the next problem)

**2) Please try this next one. What number goes in the box to make this problem true?**

3 + 7 = 10

3 + 7 = 3 + 🞎

[On mouse click]

[If CORRECT]: **You are right! Your answer was X and the correct answer is 7.** (mouse click)

[If INCORRECT]: **Good try, but your answer was X and the correct answer is 7. Now I’ll put the correct answer in the box.** (Mouse click)

**3 plus 7 equals 3 plus 7.**

(Mouse click again) **Why does 7 make this a true number sentence?**

Accept any explanation. However, if student doesn’t give a response or says don’t know, re-phrase: **“Why does it make sense to put 7 in the box and not some other number?”**

If give no response or say don’t know: **That’s ok, thanks for thinking about it some.**

If give a response**: Thanks for thinking about it.** (can ad lib general praise for thinking hard).

(Mouse click clears the prompts, click again for the next problem)

**3) Let’s do the next problem. What number goes in the box to make this problem true?**

3 + 7 = 10

3 + 7 = 3 + 7

3 + 7 = 🞎 + 6

[After response entered](On screen and read): **How did you solve this problem?** (Mouse click after they report). (Note: If kids re-do calculations, just tell them you’re interested in what numbers they used).

[On mouse click]

[If CORRECT]: **You are right! Your answer was X and the correct answer is 4.** (mouse click)

[If INCORRECT]: **Good try, but your answer was X and the correct answer is 4. Now I’ll put the correct answer in the box.** (Mouse click)

**3 plus 7 equals 4 plus 6**.

(Mouse click again) **Why does it make sense to put a 4 in the box and not some other number?**

Accept any explanation. However, if student doesn’t give a response or says don’t know, re-phrase: **“Why does 4 make this a true number sentence?”**

If give no response or say don’t know: **That’s ok, thanks for thinking about it some.**

If give a response**: Thanks for thinking about it.** (can ad lib general praise for thinking hard)

(Mouse click again for the next problem)

Provide encouragement before moving to next set: **You are doing a great job thinking hard about these problems. We are going to work on a new set of problems now.**

Repeat procedure for each set:

General rules – only prompt for strategy report on 3rd problem in block

Prompt for explanation on 2nd and 3rd problems, alternating which prompt is used.

*Set 2:*

3+4+8 = \_\_ 15

3+4+8= \_ + 8 7

3+4+8=5+\_ 10

**You are doing a great job thinking about these problems. We are going to work on a new set of problems now.**

*Set 3:*

9+6+5+5 = \_ 25

9+6+5=\_+5 15

9+6+5=10+\_ 10

**You are doing a great job thinking about these problems. We are going to work on a new set of problems now.**

*Set 4:*

5+3+9=\_ 17

5+3+9 = \_+7 10

5+3+9 = 5+🞎 12

Standard responses to struggling students during solve block:

How to respond if student makes discouraging statements like “This is too hard”

“I think you are doing a great job thinking about these problems.”

If student refuses to start a problem/give numeric answer:

“What can you do to get started?”
“What numbers do you want to add first?”

If student refuses to give explanation:

“You don’t need to be sure – can you make a guess?”

Other guidelines:

If student starts writing out problems on scratch paper instead of using it for addition/subtraction, guide their attention to the screen and let them know they don’t need to write out the problems on paper.

If student says a math fact that is wrong (“Because 6 plus 3 equals 25”), it is OK to point out that the math fact is wrong (“6 plus 3 is 25?”) and even tell them the answer (“6 plus 3 is 9”) if needed.

Cognitive Load & Retrieval Items:

**Thanks for all your hard work! I’m interested in what you think about the problems you just solved on the computer.** Hand them the packet. (Mouse click – screen will turn gray to time).

1. **I had to think hard to do this math work.**

**Do you strongly disagree, disagree, agree, or strongly agree? Circle what you think.**

1. **I was stressed and irritated when I did this math work.**
2. **I thought about other math ideas I have learned before.**
3. **I thought about how the new problems were different from math problems I have done before.**

Escapist Thoughts, Interest/Enjoyment, Manipulation Checks, and Subjective Learning Items:

**Now I’d like to ask you about the kinds of thoughts and feelings you had while you were solving the problems on the computer just now. So, please think about how you felt when you were solving the problems just now. I will tell you some thoughts or feelings kids sometimes have. For each one, please circle the word that tells how much you agree or do not agree with this thought or feeling. When I was solving problems on the computer:**

1. **I thought about stopping.**
2. **I enjoyed solving the math problems very much.**
3. **I thought about how I couldn’t stand doing the math problems anymore.**
4. **These math problems were fun to do.**
5. **I thought about quitting.**

**Turn the packet over to question 6.**

1. **The math problems were very interesting.**
2. **Compared to other math work I have done, the math problems we did today were hard.**
3. **The math problems were confusing.**

**Now, I just have a couple more questions for you.**

1. **If I saw this problem: 5 + 2 + 3 = 7 + \_\_, I could solve it correctly.**

 **10. I know what the equal sign means.**

(Mouse click to stop timing)

**BREAK**

Give the students a short break – mostly to pick out their candy! Let student stretch or get a drink of water if necessary.

**Thanks for working so hard on this. Pick out a piece of candy to eat while you work on this last part.** (Show them box of candy).

**Posttest**

*MEMORY ITEMS*

**Next, we’re going to answer some questions on paper. The next two problems are like the ones you did earlier. I’ll show you a math problem on the computer for 5 seconds. Look at it carefully, and try to remember exactly what you see. After the problem goes away, I want you to write exactly what you saw. Are you ready?** If they are holding their pencil, ask them to put it down.

The screen should be yellow, Press mouse button when ready to show first problem. It will appear for 5 seconds and then a gray screen will appear for 20 seconds. If they finish before the 20 seconds is up, you can click to move on. Always ask, “Ready for the next one?”

Problem a: 4 + 3 + 9 = 4 + \_\_

Problem b: 8 + 6 + 3 = \_\_ + 2

(Mouse click to start timing the Procedural Knowledge section of the posttest. The screen should be black.)

*PROCEDURAL KNOWLEDGE PROBLEMS*

**Here I’d like you to solve some problems on your own.**

**If you’d like help adding on the problems, you may use anything that helps. like your fingers** <Add for all 2nd graders and 3rd graders with a learning disability, add additional tools suggested by teacher>**, a number line, a hundreds chart, or touchmath. I’ll leave them here for you to use if you’d like.**

**On these problems, figure out what number goes in the box. Please show your work by writing down the numbers that you added or subtracted. You may work until you get to the stop sign. If you have any questions, please ask and I will try to help.**

Check to make sure the child shows work on the open-ended problems.

(The computer will time the OE section and the screen will turn yellow when time is up. Mouse click to stop earlier. Mouse click again to begin the CK section, which is also timed).

*Read through each question for the rest of the posttest.*

**Working Memory Measure: Task 2**

**[The Backwards Digit and Letter Span Tasks will be counterbalanced (half the kids will get Letter span first; half will get digit span first)]**

Press the mouse button to stop the Posttest clock. The screen will turn gray, and will record how long the Backwards Span Task takes.

***I am going to say some numbers/letters, and when I stop I want you to repeat them back to me, but backwards. For example, if I say 8 – 2/Q – B, what would you say?***

* CORRECTLY: If the child response correctly (2 – 8/ B – Q), say: **That’s right.** Proceed to Trial 1.
* INCORRECTLY: If the child responds incorrectly to the sample item, say:
* *Letter Span:*
	+ **No, you would say Q – B. I said B – Q, so to say it backward, you would say Q – B. Now try these letters. Remember, you are to say them backward. I – L.**
* *Digit Span*:
	+ **No, you would say 2 – 8. I said 8 – 2, so to say it backward, you would say 2 – 8/. Now try these numbers. Remember, you are to say them backward. 5 – 6.**

Whether or not the child response correctly (6 – 5/L – I) to the second sample item proceed to trial 1.

Use the Backward Digit Span sheet for the rest of the task.

Write down their response in the “response” column (next to the numbers to be read).

Read the numbers clearly at a rate of 1 per second.

Do NOT give feedback.

**Retrieval Fluency Task**

*Note: If you are close to 50 minutes for the session, end now and skip this task.*

**Great job thinking so hard about this. Are you ready for one more activity? I am going to give you a category, and I would like you to say as many words from that category as you can.**

**So for example, if I said the category “furniture,” you could say “chair, bookshelf, and sofa.” Can you think of another word that belongs to the category “furniture”?** Wait for child to respond. Give feedback (e.g., **“that’s right.” Or, “actually…Can you think of something else?”).**

**I’d like you to spend 1 minute naming as many things in a category as fast as you can. Do you have any questions?**

**Okay, let’s begin. The first category is “animals.” Please name as many animals as you can. You can begin.** (Hit RECORD and say subject number. Time for 1 minute. Write down what they say on the back of the working memory record sheet).

When 1 minute is over, say, **“Okay, now, let’s move on to one more category. I’d like you to name as many “things to eat” as you can. You can begin.** (Make sure you are recording. Time for 1 minute). If they start naming weird things people eat like cockroaches or grasshoppers, tell them to stick to things people normally eat.

When time is up, say, **“Okay, great job today! Thanks for your help.”**

**End of Session**

Thank them and let them leave. Ask them to send the next child, if applicable. (Sometimes, you will need to go get the next child with them, esp. if you are far from the classroom or if you have not made sure there are no tests that day with the teacher.)