HIGH KNOWLEDGE/NO FEEDBACK CONDITION

*WHAT TO BRING*

Papers/Forms

* Participant List, Schedule
* Scripts (Intervention and Posttest) & Scrap Paper
* Posttests, Strategy Record Sheet, Digit Span Form

Computer

* Power Cord, Mouse, Number Pad
* Microphone, Digital Voice Recorder, Batteries

Other/Miscellaneous

* Pencils
* File folder for putting collected data in
* Extension cord and 3-prong adapter

*SET UP*

1. Turn on laptop. Plug in number pad & mouse (USB ports).
2. Set up webcam and microphone.
   1. Plug in microphone (rightmost input under trackpad). Two windows pop up. In the beige window, click “Device: Mic.” Close the black window.
   2. Double click on the Camtasia Recorder icon on desktop.
   3. Make sure microphone is on and working.
   4. Press the record button. After experiment is finished, press Function+F10. The video will open in a screen. Save it. You are now ready to run the next child.
3. Open E-Prime Program on desktop (ATME3d\_FINAL). Enter participant ID, grade, and your initials. Then select the number corresponding to the child’s condition.
   1. If you need to exit E-prime during the program, press CTRL+ALT+SHIFT.
   2. Cap a session at 60 minutes.

*INTRODUCTION*

**Today you’re going to try to solve some math problems. You will learn a lot of new things, but it won’t be easy. You will probably make mistakes. That’s okay. The most important thing will be for you to think about the problems and try to understand them. This will give you a chance to practice and improve your abilities in math. These problems are important because if you try your best to understand the problems, you will learn more about math! So what we want you to do is learn new things.**

*PROCEDURAL INSTRUCTION*

**Now, we’re going to go through a short lesson about how to solve these math problems. The problems will look something like this:** (Mouse click)

**3 + 4 + 2 = 3 + \_\_**

**Just like this problem, all of the problems we’ll work on now will have a blank and we need to figure out what number goes in the blank. There is more than one way to solve this type of problem, but I‘m going to show you one way to solve them today.**

**First, you should see that there are two sides to this problem, one on this side of the equal sign and one on the other side of the equal sign. One side is 3 + 4 + 2** (sweep side) **and the other side is 3 + blank** (sweep side)**.**

**Here is how you can solve this problem.**

**First, you add up the numbers on this side of the equal sign** (sweep side**). Then, find the number that goes in the blank that will make this side** (sweep side) **add up to that same number. Let me say that again. First, you add up all the numbers on this side** (sweep side)**. Then, you find the number to go in the blank that will make this side** (sweep side) **add up to the same number.**

**So for this problem, what is 3 + 4 + 2?** (Wait for response.)

**Right, this side has 9.**

**And what number goes in the blank to make this side have 9 also?** (Wait for response.)

**Right, 6, because 3 + 6 is also 9. So our answer is 6.** (Type in 6.)

**Let’s look at another example to make things more clear.** (ENTER)

**8 + 4 + 7 = 8 + \_\_**

**Every time you see an addition problem with a blank like this, you can:**

**First, add up the numbers on the one side of the equal sign** (sweep side)**.**

**Then, find a number to go in the blank that will make this side** (sweep side) **add up to the same number you got on the first side** (sweep side)**.**

**So for this problem, what is 8 + 4 + 7?** (Wait for response.)

**Right, 19.**

**And what number goes in the blank to make this side have 19 also?** (Wait for response).

**Right, 11, because 8 + 11 is also 19. So our answer is 11.** (Type in 11.)

**Okay, let’s try another example.** (ENTER)

**5 + 4 + 3 = \_\_ + 5**

**Can you tell me which side to start this problem on?** (Wait for response.)

**We start on the first side with 5 + 4 + 3** (sweep side)**. So, we can add up the numbers on this side** (sweep side)**. Then, find a number to go in the blank that will make this side** (sweep side) **add up to the same number.**

**If we add up this side, what do we get?** (Wait for response.)

**We get 12.**

**What is our next step?** (Wait for response.)

**To finish, we find a number to go in the blank that will make this side the same number. So we need this side to have 12 altogether. What plus 5 is 12? 7 + 5 = 12. So our answer is 7.** (Type in 7.)

**Now I want you to think about everything we have talked about so far, and let’s look at one more problem together, okay?** (ENTER)

**2 + 1 + 4 = \_\_ + 4**

**Can you point to the numbers we’re going to start with?** (Wait for response.)

**We start on the first side with 2 + 1 + 4** (sweep side)**.**

**How should we solve this problem?** (Wait for response.)

**We start by adding up the numbers on the first side.**

**What do the numbers on the first side add up to?** (Wait for response.)

**Right, so we know 2 + 1 + 4 = 7.**

**Now we need to have this side equal 7 also. How many are already on this side** (sweep side)**?** (Wait for response.)

**This side already had 4. So what plus 4 is equal to 7? 3 + 4 is equal to 7, so 3 is the number that goes in the blank.** (Type in 3). (ENTER)

*MANIPULATION CHECK*

Turn on digital voice recorder. Have child solve problems until he/she gets one correct.

**Okay. Thanks for listening so carefully. Now, can you use the strategy I just taught you to solve this problem on your own?** (Mouse click)

**Find the number that goes in the blank to make this number sentence true.**

**7 + 6 + 2 = 7 + \_\_**

(Have child type in response with number pad and then hit ENTER.)

**How did you solve that problem?**

If CORRECT answer and CORRECT strategy: **Good job! 8 is the correct answer. You used a correct strategy. You** (repeat child’s correct strategy)**. Great work!** (Continue on to Exploratory Problem Solving.)

If INCORRECT answer and CORRECT strategy: **Good try, but that is not the correct answer. It sounds like you used a correct strategy. You** (repeat child’s strategy)**. But then you made a small arithmetic mistake and got the incorrect answer. Try to solve that problem one more time.** (Continue on to Exploratory Problem Solving.)

If INCORRECT strategy: **Good try, but that is not the correct answer. Remember, to solve this problem correctly, you add up the numbers on the first side of the equal sign. Then, you figure out what number goes in the blank to make this side have that same number. Try again to use that correct strategy to solve a problem on your own.**

Computer program will automatically proceed to exploratory problem solving OR to an extra manipulation check problem based on child’s answer. Then it will go to a READY screen.

Extra Problems:

4 + 5 + 8 = \_\_ + 8

3 + 6 + 5 = 3 + \_\_

9 + 1 + 2 = \_\_ + 2

7 + 3 + 4 = 7 + \_\_

2 + 8 + 3 = \_\_ + 3

*EXPLORATORY PROBLEM SOLVING*

**Now I’m going to have you practice solving some problems on your own. These are very similar to the problems we just worked on together. For these problems, you need to figure out the number that goes in the box to make the number sentence true. Some of them may seem difficult or unfamiliar. That’s okay. Just try your best.**

**After each problem, I would like you to tell me when you are finished.**

**Let’s look at the first problem.** (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 your answer, you can type it using this** (hand them number pad), **and then press ENTER.**

1) 10 = 3 + \_\_

**Can you tell me how you solved the problem?**

Record child’s strategy on the strategy record sheet. If it is ambiguous, give additional prompt:

**I’m not sure I understand. Can you point to the exact numbers that you added or subtracted or tell me the numbers?** Mark any strategies on the record sheet that need confirmed.

Do not give any feedback. Try not to say anything positive or negative.

**Okay, please try the next problem.**

Repeat for remaining problems.

2) 3 + 7 = 3 + \_\_

3) 3 + 7 = \_\_ + 6

4) 3 + 6 = 3 + \_\_

5) 3 + 4 + 8 = \_\_ + 8

6) 5 + 3 + 9 = 5 + \_\_

7) 9 = 3 + \_\_

8) 9 + 7 + 6 = \_\_ + 6

9) 3 + 7 + 8 = \_\_ + 8

10) 7 = 6 + \_\_

11) 4 + 5 + 3 = 4 + \_\_

12) 8 + 3 + 7 = \_\_ + 7

After the last problem, a Subjective Questions screen will appear.

*SUBJECTIVE QUESTIONS*

Turn off digital voice recorder.

**Thanks for all your hard work! I’m interested in what you think about the problems you just solved. There are a few statements that I’ll read through with you.** Hand student the paper.

**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 solving the problems just now:**

**1. I had to think hard to do this math work. Do you strongly disagree, disagree, agree or strongly agree? Circle the answer that matches how you think.**

**2. I was stressed and irritated when I did this math work.**

**Now I’d like to ask you about a few more thoughts and feelings you had while solving the problems on the computer just now. I will tell you some thoughts or feelings that kids sometimes have. For each one, circle the answer that matches your response. When I was solving problems on the computer just now:**

**4. I enjoyed solving the math problems very much.**

**5. These math problems were fun to do.**

**6. The math problems were very interesting.**

*BREAK*

Give students a short break—mostly to pick out their candy. Let student stretch or get a drink of water if necessary. (There will be a white blank screen followed by a READY screen.)

*POSTTEST*

MEMORY PROBLEMS

**Now, I’m going to have you answer a few questions on paper. First, I’d like you to remember a problem for me. I’m going to show you a math problem on the computer for 5 seconds. I don’t want you to solve it. Just 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?**

Press mouse button when ready for first problem. It will appear for 5 seconds and then a gray screen will appear for 20 seconds. If they finish before 20 seconds, you can click to move on.

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

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

**Now we’ll go through the rest of the packet together. Turn to page 2.** (Mouse click and the computer will time the rest of the posttest.)

OPEN-ENDED PROBLEMS (Pages 2 & 3)

**Here I’d like you to solve some problems on your own. Figure out what number goes in the box. Please write down the numbers that you added or subtracted. You may work until you get to the stop sign on page 3. If you have any questions, please ask and I will try to help.**

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

Read through each question for the rest of the posttest.

Mouse click when finished. A READY screen will appear. Click again to time BDS task.

*BACKWARD DIGIT SPAN TASK*

Read a series of digits. After the final digit, the child is expected to repeat the digits backward.

Record on the backward digit span sheet in the packet.

**Okay, we’re finished with the questions on paper. Now we’re going to do a different sort of task. I am going to say some numbers. When I am finished I want you to say the numbers in backward order. For example, if I say 8 – 2, what would you say?**

CORRECTLY: If the child responds correctly (2 – 8): **That’s right.**

Proceed to Trial 1.

INCORRECTLY: If the child responds incorrectly: **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) to the second sample item proceed to trial 1. Give no help on the second example or on any of the test items that follow.

*RETRIEVAL FLUENCY TASK*

**Great job so far! Are you ready for one last 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. 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 response. Give feedback (e.g., **That’s right. / Hmm, can you think of something else?)**

**I would 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 may begin.** (Hit record and say the subject number. Click so computer will time for 1 minute. Write down what student says on the back of the Backward Digit Span sheet.)

When 1 minute is over: **Okay, now let’s move on to one more category. This time, I would like you to name as many “THINGS TO EAT” as you can. You may begin.** (Make sure you are recording. Time for 1 minute. If child starts naming weird things, such as grasshoppers or other bugs, tell them to stick to things people normally eat.)

When 1 minute is over: **Okay, great job today! Thanks for all your help.**

*END OF SESSION*

Take child back to classroom.