

## **Supplementary Materials**

### **1. Questions about mathematical background abilities**

**Describe the level of mathematical education you have received.**

I have not taken algebra and geometry courses.

I have taken algebra and geometry courses.

I have had calculus but not more advanced courses.

I have had more advanced courses but do not have a STEM background.

**Describe your mathematical proficiency on a scale from 1-9.**

Multiple choice response: 1 (Not at all proficient), 2, 3, 4, 5 (Somewhat proficient), 6, 7, 8, 9 (Extremely proficient)

**I feel really confident doing calculations without using a calculator.**

Multiple choice response: Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree

## 2. Add Out of Order Frequency (Study 1)

<b>Supplementary Table 1.1</b> <i>Control Group Add Out of Order Frequency</i>	
Problem	Percent Added Out of Order
5+9+2	57.23
5+8+1	55.97
9+7+4	50.94
8+5+9	47.8
9+5+8	47.17
8+3+6	45.91
4+9+7	43.4
6+2+5	39.62
5+2+6	38.99
5+3+4	38.36
3+4+5	37.74
8+9+5	37.74
4+2+9	35.85
2+4+9	34.59
5+4+3	33.33
2+9+4	31.45
1+8+5	30.19
6+3+8	26.42
5+6+8	23.27
4+5+2	22.01

<b>Supplementary Table 1.2</b> <i>Sum to Ten Group Add Out of Order Frequency</i>	
Problem	Percent Added Out of Order
5+9+1	64.78
5+8+2	63.52
9+7+1	60.38
2+9+1	59.12
9+5+1	57.86
8+9+2	53.46
5+6+4	52.2
1+3+7	52.2
1+5+9	50.31
9+2+8	49.69
2+1+8	47.8
1+7+3	47.8
7+4+6	47.17
4+7+6	44.65
6+3+4	44.65
7+1+9	44.03
4+3+6	42.14

5+2+8	42.14
7+1+3	38.99
3+6+7	38.99

<b>Supplementary Table 1.3</b> <i>Sum to Twelve Add Out of Order Frequency</i>	
Problem	Percent Added Out of Order
7+6+5	57.23
9+4+8	51.57
8+9+3	48.43
9+5+3	47.8
9+7+5	47.8
7+4+5	44.65
8+9+3	44.65
3+8+9	43.4
8+3+4	43.4
9+8+4	38.99
1+7+5	35.85
1+5+7	35.22
4+3+8	30.82
4+5+8	30.82
3+4+9	27.67
5+3+9	27.67
5+4+8	27.04
5+4+7	26.42
5+4+7	23.27
4+5+7	23.27

<b>Supplementary Table 1.4</b> <i>Sum to Multiple of Five Add Out of Order Frequency</i>	
Problem	Percent Added Out of Order
6+8+7	48.43
7+9+8	46.54
6+8+9	45.28
7+4+1	44.65
9+7+8	44.03
1+2+4	42.14
8+6+7	40.25
7+9+6	40.25
6+2+3	40.25
9+8+6	36.48
3+6+2	36.48
2+4+3	33.96
4+3+2	33.33
6+3+2	33.33
1+7+4	32.7
3+4+2	30.82
2+4+1	28.93
5+6+9	26.42
4+2+1	23.9

7+1+4	23.9
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<b>Supplementary Table 1.5</b> <i>Sum to Third Integer Add Out of Order Frequency</i>	
Problem	Percent Added Out of Order
5+8+3	63.52
9+5+4	62.89
7+9+2	59.75
5+9+4	59.12
9+4+5	58.49
8+5+3	57.86
9+7+2	55.97
7+6+1	55.35
4+9+5	54.09
1+6+5	50.94
6+7+1	47.17
3+8+5	45.91
1+7+6	44.03
6+1+5	43.4
7+1+6	42.14
8+3+5	41.51
6+5+1	37.74
5+6+1	37.11
2+9+7	32.08
9+2+7	32.08

<b>Supplementary Table 1.6</b> <i>Duplicate Values Add Out of Order Frequency</i>	
Problem	Percent Added Out of Order
8+5+8	63.52
4+9+9	63.52
9+8+9	61.01
1+5+5	61.01
5+6+6	58.49
7+9+7	57.23
9+4+4	57.23
1+7+7	57.23
5+9+5	54.72
4+9+4	54.09
1+8+8	52.2
6+3+6	44.65
8+3+3	44.65
1+2+2	44.65
4+5+4	41.51
9+2+2	38.99
2+4+2	36.48
3+5+3	34.59
5+1+1	28.93
1+5+1	26.42