



## Touch Your Toes

### ● **Concept**

The human nervous system is extremely complex. There are differences in the amount of somatosensory representation in the cortex of the brain for different parts of the body. This means your ability to tell where you are being touched varies for different parts of the body—even for parts that are close to one another.

### ● **Materials Needed**

- a table and two chairs
- blindfold
- washable markers with black, red, blue, and green ink
- alcohol prep pads
- access to soap and water or hand sanitizing liquid
- data sheet

### ● **Assembly**

- no assembly required

### ● **Procedure**

1. Invite five people to help you with this project. Explain that participation will require being blindfolded while sitting in a chair and that you will be touching their fingers and toes as part of this project. (Participants can observe your interaction with other participants without compromising the project.)
2. Instruct the first participant to have a seat in one of the chairs. Ask the participant to remove the shoe and sock from one foot and place the foot on the seat of the other chair. Cover the participant's eyes with the blindfold. Instruct the participant to place one hand palm up on the table.
3. Let the participant know that you are about to touch his or her hand and ask some questions.
4. Use the pen with black ink to touch (and mark) the finger tip on one of the participant's fingers. Ask the following question:  
*Which finger did I touch: your thumb, index finger, middle finger, ring finger, or little finger?*
5. Record the finger you touched and the participant's response on the data sheet using the pen with black ink. Do not tell the participant if the response was correct or not.
6. Repeat Step 4 using the pen with red ink. Be sure to touch a different finger. Record the finger you touched and the participant's response on the data sheet using red ink. Do not tell the participant if the response was correct or not.
7. Let the participant know that you are about to touch his or her foot and ask some questions.
8. Use the pen with black ink to touch (and mark) the bottom of one of the participant's toes. Ask the following question:

*Which toe did I touch: your big toe, the second toe, the middle toe, the fourth toe, or the little toe?*

9. Record the toe you touched and the participant's response on the data sheet using black ink. Do not tell the participant if the response was correct or not.
10. Repeat Step 9 three times with the following exceptions:
  - Use the different ink colors in this order: red, blue, and green ink. (When you record the participant's response, use the same color ink used for the touch.)
  - Choose different toes for at least three of the four trials.
  - Make sure you touch the big toe at least once.
11. Record the toes you touched and the participant's responses on the data sheet. Do not tell the participant whether or not his or her response was correct until the participant's session is over.
12. At the end of the session with each participant, you can share the accuracy of the responses. (The ink color on the tip of the participant's fingers and toes should correlate to the ink used on the response sheet.)
13. Repeat Steps 1 through 12 for each participant. Between participants, wipe off all pens with an alcohol prep pad and wash your hands with soap and water. If soap and water are not available, use hand sanitizing liquid.

### Things to Observe

Directions: Answer the following questions on a separate sheet of paper.

- How accurate were participants in identifying the fingers you touched? Using the data for all the participants, calculate the percentage of times that the response was correct for each finger: thumb, index finger, middle finger, ring finger, and little finger.
- How accurate were participants in identifying the toes that you touched? Using the data for all the participants, calculate the percentage of times that the response was correct for each toe: big toe, second toe, middle toe, fourth toe, and little toe.

### Analyzing the Results

Directions: Answer the following questions on a separate sheet of paper.

1. Create a bar graph to illustrate the percentage of correct responses for each finger and toe.
2. In general were the responses for the fingers more accurate than the responses for the toes? Offer an explanation.
3. Were the responses for any particular toe more or less accurate than for the other toes? Offer an explanation.
4. What can you conclude by analyzing your results? Which of your fingers and toes are most sensitive to touch?

**Data Sheet**

**Directions:** Use this data sheet to record the touches you make and the corresponding responses from participants. Use the key printed below when recording data.

<b>Finger:</b>	1 = thumb	2 = index finger	3 = middle finger	4 = ring finger	5 = little finger
<b>Toe</b>	1 = big toe	2 = second toe	3 = middle toe	4 = fourth toe	5 = little toe

<b>Participant</b>		<b>Actual Touch</b>	<b>Participant Response</b>
1	Finger Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
1	Finger Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
1	Toe Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
1	Toe Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
1	Toe Touch C (blue ink)	1 2 3 4 5	1 2 3 4 5
1	Toe Touch D (green ink)	1 2 3 4 5	1 2 3 4 5
2	Finger Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
2	Finger Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
2	Toe Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
2	Toe Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
2	Toe Touch C (blue ink)	1 2 3 4 5	1 2 3 4 5
2	Toe Touch D (green ink)	1 2 3 4 5	1 2 3 4 5
3	Finger Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
3	Finger Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
3	Toe Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
3	Toe Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
3	Toe Touch C (blue ink)	1 2 3 4 5	1 2 3 4 5
3	Toe Touch D (green ink)	1 2 3 4 5	1 2 3 4 5
4	Finger Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
4	Finger Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
4	Toe Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
4	Toe Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
4	Toe Touch C (blue ink)	1 2 3 4 5	1 2 3 4 5
4	Toe Touch D (green ink)	1 2 3 4 5	1 2 3 4 5
5	Finger Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
5	Finger Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
5	Toe Touch A (black ink)	1 2 3 4 5	1 2 3 4 5
5	Toe Touch B (red ink)	1 2 3 4 5	1 2 3 4 5
5	Toe Touch C (blue ink)	1 2 3 4 5	1 2 3 4 5
5	Toe Touch D (green ink)	1 2 3 4 5	1 2 3 4 5

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