



Temporal stability and situational influences on finger counting procedures – insights from large-scale survey

Krzysztof Cipora^{1,2}[krzysztof.cipora@gmail.com], Aleksandra Machniak¹, Kinga Wołoszyn¹, Mateusz Hohol^{2,3}

¹Institute of Psychology, Jagiellonian University, Cracow; ²Copernicus Center for Interdisciplinary Studies, Cracow; ³Polish Academy of Sciences

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Background

1. Finger counting is an important signature of embodied mathematical cognition
2. Its direction is supposed to be related with cultural factors (e.g. reading direction), however this claim has also been challenged
3. Recently Wasner et al. (2014) demonstrated that finger counting direction may be determined by situational influences

Aims of the presented study

1. Investigate finger counting habits in Polish participants controlling for their handedness
2. Explicitly ask whether their finger counting routine is stable or not
3. Test whether using other-than-typical strategy is uncomfortable
4. Ask about typical situations participants use finger counting
5. Investigate temporal stability of finger counting sequences by administering the same questionnaire twice (delay of 2-3 months)

Experiment 1 – exploratory study on finger counting in Polish participants

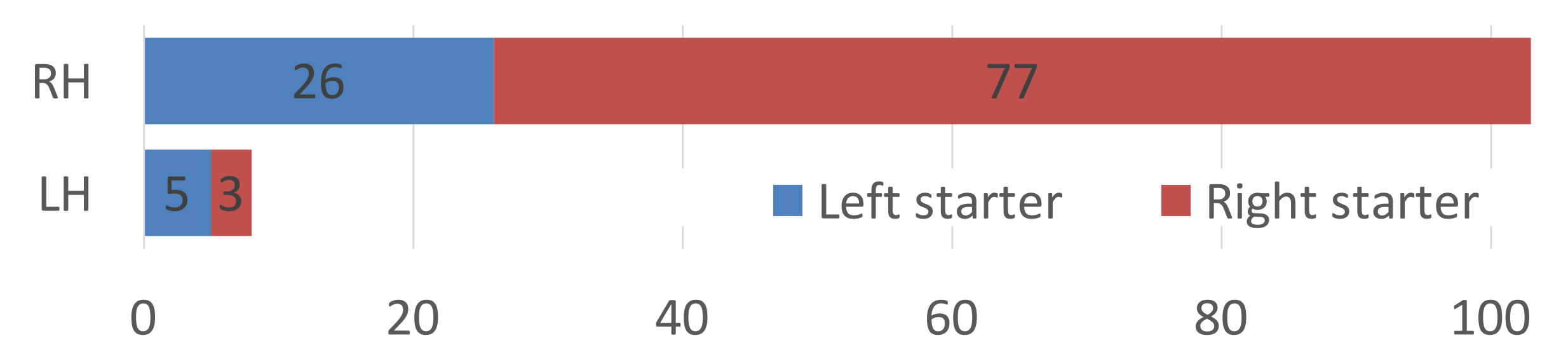
Participants:

112 volunteers (75F), mean age 23.3 (SD = 3.76)

Materials and procedure:

1. Hold your hands along your body
2. Count on your fingers.
3. Memorize the sequence
4. Mark it on a questionnaire (two hand drawings)
5. Fill an *Edinburgh Handedness Inventory*

Proportion of Right- and Left-starters by handedness



Typical sequence (present in 85 participants) was from thumb, continued anatomically (with the thumb of the other hand). Significant difference in proportions of left and right starters by handedness (Fisher's exact test; $p = .037$).

Experiment 2 - finger counting routines and its stability in Polish participants

Participants:

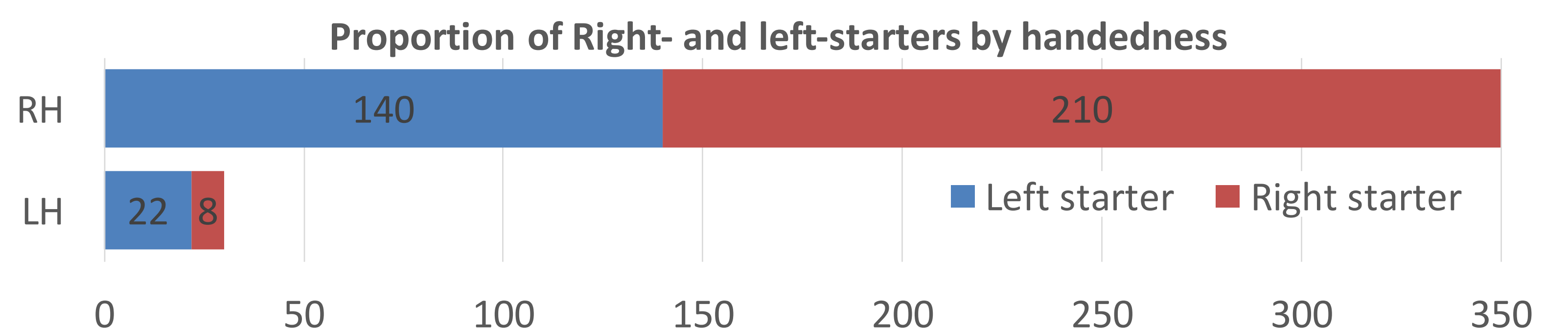
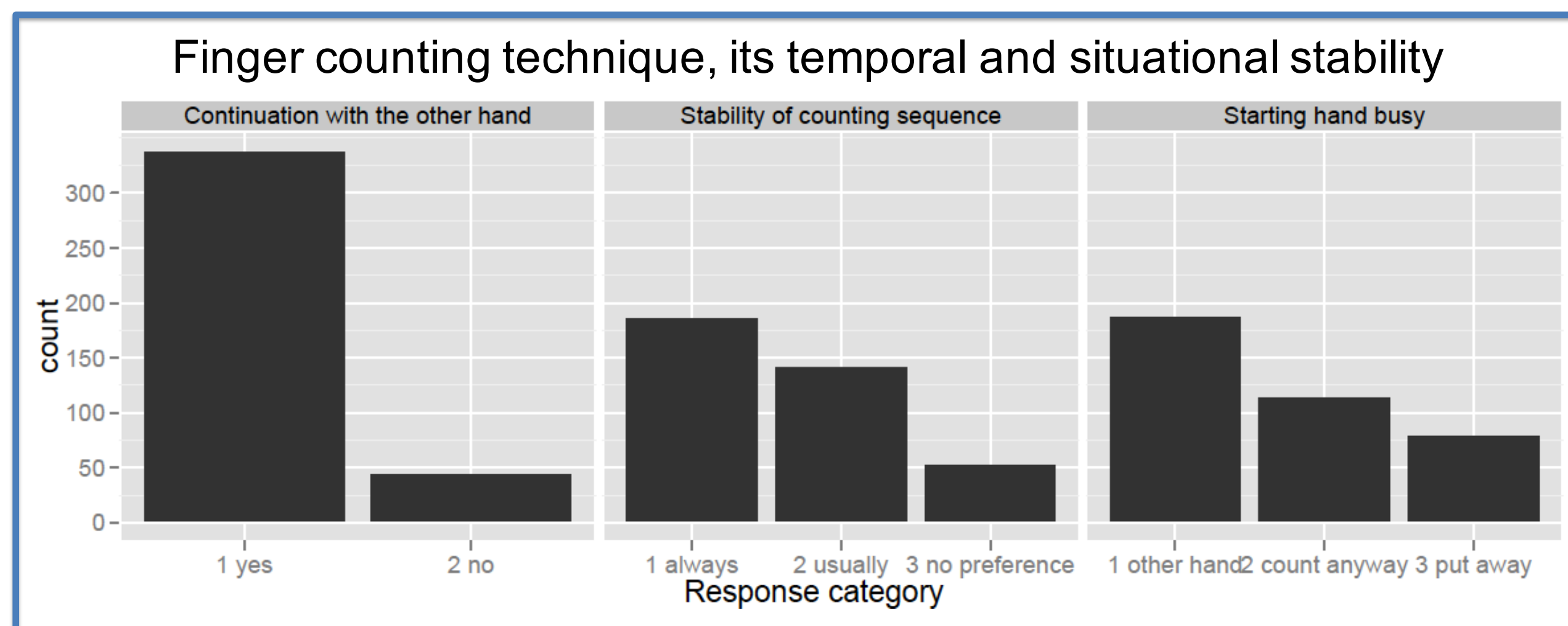
385 students (law and psychology; 240 F), mean age 20.7 (SD = 3.6). 68 tested for the second time 2 months later

Materials and procedure:

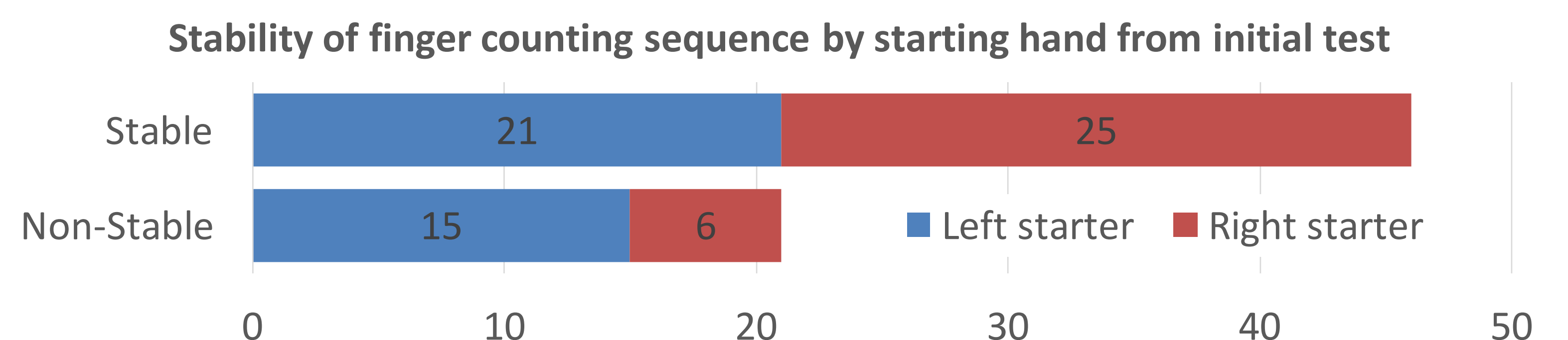
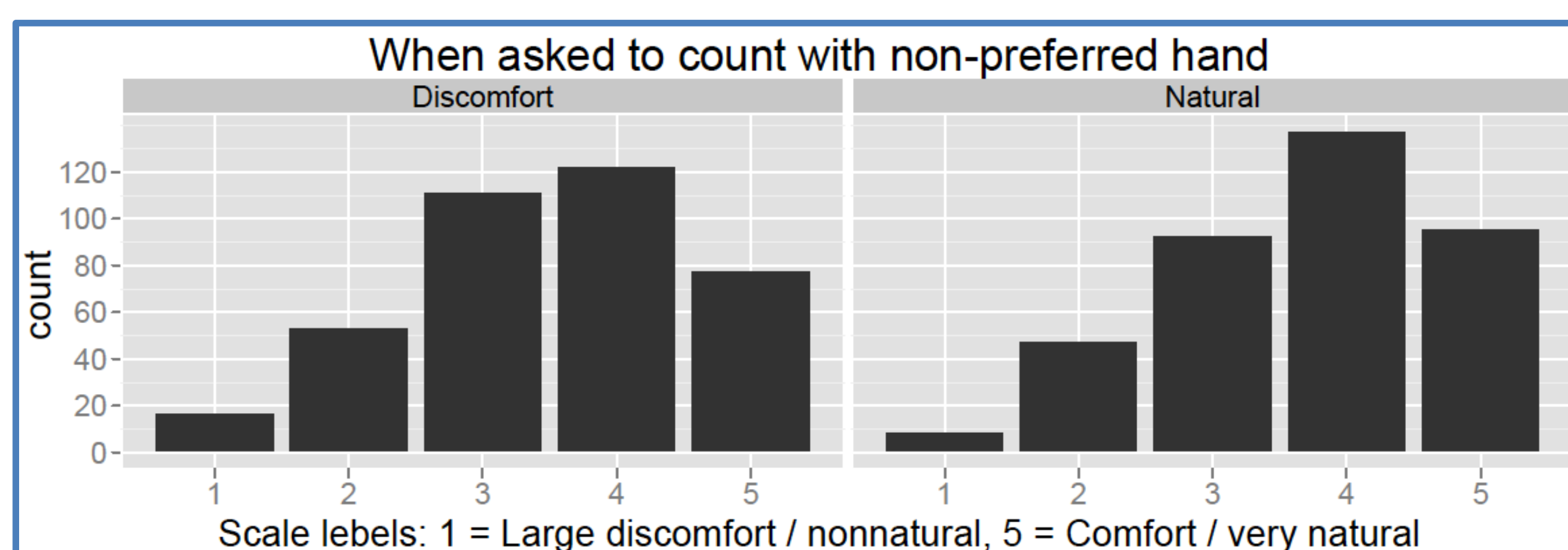
1. Hold hands along your body
2. Count on your fingers and mark it on a questionnaire
3. Report your finger counting habits: how strongly you prefer given counting sequence
4. Mark how often you use finger counting in given situations
5. Fill an *Edinburgh Handedness Inventory*.

RESULTS

When adjusted for multiple comparisons Left starters did not differ from right starters in their reported stability, counting with non preferred hand and frequency of finger counting use.



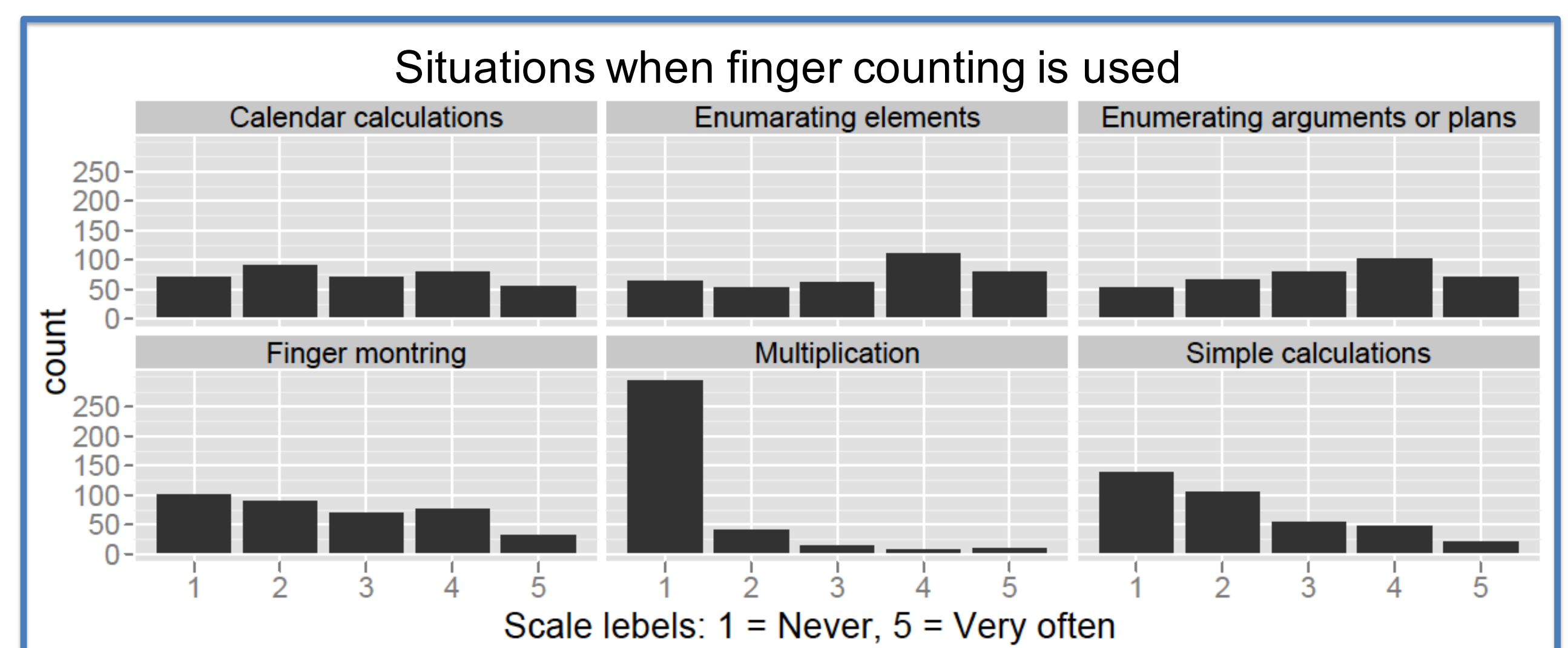
Significant difference in proportions of left and right starters by handedness (χ^2 , $p < .001$).



Significant difference in proportion of participants whose counting sequence was stable across sessions depending on whether they started from right or left in the initial test (χ^2 , $p = .05$). Left and right handers did not differ in their finger counting stability ($p = .704$)

Frequency of finger counting use:

1. In case of separate items no difference by starting hand and handedness
2. As regards overall finger counting use index (summed answers to all items):
 1. Right handers reported more finger counting use than left handers ($p = .023$)
 2. No difference between left and right starters ($p = .407$)
 3. No difference between stable and nonstable individuals ($p = .286$)
 4. No difference between individuals reporting stable and non stable finger counting routines ($p = .188$)



TAKE-HOME MESSAGES

1. Most typical finger counting sequence in Polish participants is to start from RH and continue anatomically
2. Left-handers tend to more often start from LH
3. Only c.a. 50% participants declares that their finger counting routine is stable over time
4. Right-starters are more stable than left-starters
5. As regards role of finger counting direction for number processing, the problem of temporal stability needs to be challenged.