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1) Have any data been collected for this study already?

No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?

Here, we ask whether the inversion property of Dutch number words influence Native Dutch speakers' performance on a standard 0-100 NLE task. If so, this would suggest that the order in which digits are typically spoken plays a role in the previously measured left digit effect (LDE) in number line estimation (NLE). In English, the leftmost digit is spoken first but in Dutch, number language includes number words characterized by the inversion property such that the number "twenty-eight" in English translates to "eight and twenty" in Dutch. If the order in which digits are typically spoken contributes to the LDE in NLE, the LDE for NLE presented in Dutch should differ significantly from the LDE for NLE presented in English. If the order in which digits are typically spoken does not contribute to the LDE for NLE, the LDE should be roughly the same when presented in Dutch or English.

3) Describe the key dependent variable(s) specifying how they will be measured.

We will record estimates for target values drawn from a set of paired numerals falling on either side "tens" boundaries (e.g. 49/53). "Tens" difference scores will be calculated to determine whether placements differ more than they should for numbers with different digits but similar magnitudes. For each "tens" pair of target values from each participant's data we will calculate placement for larger numeral – placement for smaller numeral for nineteen total pairs (e.g. the estimate for 53 minus the estimate for 49). These difference scores are an index of the LDE.

4) How many and which conditions will participants be assigned to?

Within subjects Language Blocks: Dutch or English. Participants randomly assigned to: Dutch/English or English/Dutch conditions.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

For each participant we will calculate a mean difference score for "tens" pairs for each language block. Between-subjects difference scores for tens pairs will be compared (first block only) to test for any influence of the inversion property of Dutch number words on the LDE. We will compare difference scores (t-test) for participants tested in Dutch to difference scores from a separate group of participants tested in English. If they differ, with smaller difference scores in Dutch, this will suggest that the inversion property does play a role. If they do not differ, there are at least two possible interpretations. One is that the inversion property does not play a role at all. Another is that the inversion property does play a role, but any effects occur based on the language in which one first learned to read/write number words (these two possibilities cannot be distinguished by this study). We will also do a within-subjects comparison of difference scores (with a paired t-test) to explore the same question, keeping in mind that order effects may also influence performance within-subjects (no differences here might be due to order effects). If the between-subjects first-block analysis reveals an effect, but this comparison does not, we will interpret this pattern of findings as evidence of an influence of spoken language. We will run correlations between participant's LDE in NLE (in both language conditions) with levels of language fluency.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

An individual's estimates for a target value will be removed if it differs from the group mean for that target value by more than 2 SDs. Participants excluded if > 5 paired estimates missing.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

Planned sample: we are aiming for an N of 20 (usable participants) per order, for a total of 40 usable adult participants. Participants will be at least 18 years of age, and must be fluent in English and Dutch. We will stop collecting data once we reach our target sample size or, given that our study is a highly specialized population, have exhausted recruitment of the target population.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

We will also include a language questionnaire.