Additional Methods

Originally, we used manually defined anatomical region of interests (ROI). During the review process, we switched to using a surface-based probabilistic mask. We also originally had included a second analysis using Dice coefficients which we decided to pull from the manuscript as some of the reviewers pointed out some weaknesses with the Dice analysis that we agreed with after reexamining our results. This document contains the original description of manual ROI and Dice analysis for transparency.

Regions of interest

Each participant's anatomy defined their S1 region of interest (ROI) per hemisphere, using the anatomical scan to identify the central sulcus. The maximal convexity of the central sulcus was taken as the likely location of the hand knob (1). The central sulcus was traced manually at 10 mm above and below the hand knob. An attempt was made to restrict selection to the sulcus and avoid pre- and post-central gyri. Locations at the intersection of multiple sulci were included. Manual tracing was performed on a functional scan volume aligned to the anatomical, with enhanced image contrast. All tracings were completed by the lead author. The ROI is named S1 rather than 3b, given inclusion of area 3a and likely some of area 1.

Measuring digit map separability

The separability of interdigit responses was measured using univariate dice ('overlap') coefficients (2) and multivariate representational distances (3). Dice coefficients reflect the level of shared (minimally thresholded) positive-going activity between pairs of digit response maps. Greater values indicate more overlap. Representational distances reflect the level of dissimilarity between pairs of unthresholded digit response patterns. Greater values indicate greater separability.

Dice ('overlap') coefficients

Five contrasts were performed per hand per participant: D1 > rest, D2 > rest, D3 > rest, D4 > rest, D5 > rest. Resultant activity was thresholded at z = 2.0, uncorrected, selecting only positive-going responses (4, 5). Only active voxels within the anatomically defined contralateral S1 ROI were used to compute dice coefficients, quantifying the overlap between digit response maps. Dice coefficients were computed using the minimum-cluster normalised method, dividing the number of shared voxels by the number of voxels in the smaller map.

$$D_{\mathrm{ab}} = \frac{A \cap B}{\min(A, B)} \tag{1}$$

'A' is the number of voxels comprising one digit response map and 'B' is the number of voxels comprising another digit response map. This produces measures of dice overlap ranging from 0 to 1. A dice coefficient of 0 indicates no overlapping activation between digit maps, and 1 indicates complete overlap.

If a smaller map sits entirely within a larger map, the dice coefficient is 1. This method has been used previously to quantify interdigit fMRI response separability in S1 (5).

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