DETAILED FIGURE LEGENDS

Figure 1 Summary of the complexity of behavioral tasks examined in 34 neuroimaging studies of sequence learning and/or time-interval production. Ordinal complexity represents the number of items in a sequence and/or the number of fingers and limbs that are involved in the task. Thus, a score of 1 represents a tapping task involving a single finger. A score of 5 represents 8 item sequences that are produced with 4 fingers, but in which the sequence information is restricted to a single dimension, e.g. spatial location. A score of 10 would be assigned to conditions of bimanual coordination in extended sequences of more than 20 items coded along multiple feature dimensions, e.g. spatial location and pitch. Along the dimension of temporal complexity, 1 refers to conditions in which the requirement is to produce finger sequences as fast as possible. Thus, no external or internal timekeepers are invoked. A score of 2 indicates conditions of self-paced isochronous tapping. Because most people settle at a preferred frequency, we consider self-paced isochronous tapping to be less complex than isochronous tapping at frequencies other than the preferred frequency. 3 – isochronous timing with ISIs < 2 s, 6 – time-intervals comprise simple integer rations, such as 1:2 or 1:2:4. This category also includes syncopation. 7–8 reflect polyrhythmy using more complex integer ratios such as 1:3 or 2:3. 9–10 reflect temporal complexity that is rarely encountered in music: non-integer ratios or random time intervals that form non-integer ratios. While music spans the complexity space, most music we hear and perform extends the complexity space to the right at moderate levels of temporal complexity. Because some studies report results from multiple experiments or multiple contrasts that pertain to the same location in the complexity grid, the number of contrasts can exceed the number of studies listed at each location. Also, some contrasts were judged to span several complexity levels and therefore enter into multiple locations on the complexity grid. Of 64 total unique contrasts, 17 involved a comparison of a task condition with the resting state. 31 contrasts specifically addressed increases in task complexity. Of those, 4 were against rest (situated at temporal/ordinal coordinates 6,1; 6,1; 1,4; 3,8), whereas the remaining 27 compared tasks that were matched on low-level features. Those references not mentioned explicitly in the text can be found in the supporting information. Note that while we attempted to find and incorporate all neuroimaging studies that were directly relevant to this review, we recognize that the list is not exhaustive and that some related task domains, such as temporal duration discrimination judgments, are not fully represented.

Citations in the figure:

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Figure 2 Patterns of responsiveness of different brain areas across levels of temporal and ordinal complexity. For each brain region reported as an activation locus in the studies summarized in **Fig. 1**, we tallied the number of times that brain region was reported for a contrast falling at each location on the complexity grid. These totals were then normalized by dividing by the values in Figure 1 in order to obtain the proportion of possible times the region was reported to be activated by a contrast of particular temporal and ordinal complexity. Thus, each brain area was associated with a complexity pattern. Of the 23 regions for which activations were reported, 16 were reported in more than 10 separate contrasts. (**a**) Cluster analysis of complexity patterns. In order to identify common complexity patterns across brain regions, the normalized complexity patterns for these 16 regions were clustered using the hierarchical clustering algorithm in the Matlab Statistics Toolbox, using Euclidean distances and the average distance method in forming the linkages. Related patterns are connected to a common node, and the height of the node reflects the distance between the patterns. (**b**) Proportion of contrasts in which brain regions are observed to be active at different combinations of temporal and ordinal complexity. The number of entries in the complexity grid for each brain is shown in the top right corner of each grid. Note that the total number of possible observations varies across locations in the grid (see Figure 1). Thus, for example, the observation that high temporal complexity activates the PMC in all cases may not be as reliable as the observation that relatively low temporal and moderate ordinal complexity activate PMC in all cases, due to the different total numbers of contrasts. This effect may also influence the cluster analysis. Regions of missing data are shown in magenta. Consult Abbreviations for the list of brain regions.

Figure 3. Projection of activation loci reported in 34 neuroimaging studies of sequencing (filled spheres) and 10 studies using musical stimuli and tasks (yellow outlines). Blue denotes activation foci from contrasts of simple sequencing behaviors with rest (13/33) or perceptual control conditions (20/33), whereas red spheres denote foci from 31 contrasts of complex movement conditions with less complex movement conditions, or contrasts that index explicit sequence learning or working memory. The music contrasts are more heterogeneous, involving various attentive, working memory, target detection, and motor demands. An image volume (1 mm isotropic voxels) was created with point-source activations at coordinates provided in tables reporting the results of relevant contrasts for each of the studies contributing to Fig. 1. These volumes were then summed across studies, and the resulting volume was convolved with a Gaussian filter (4 mm FWHM, isotropic) to generate visualizable maps. The gradations in blue and red hues reflect the likelihood of observing activation of any given location in normalized anatomical space, with white indicating highest likelihood. The same procedures were used to create a

volume representing the music neuroimaging studies. The anatomical image is an average of 8 spatially normalized scans of different subjects.