Language lateralization in right- and left-handed individuals: an fMRI study
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PROBLEM
Previous studies of handedness & language lateralization:
• compare mean lateralization indices (LI) between groups [1]
• present a correlation between LI and handedness quotients (HQ) [2]
• assess variability of hemisphere dominance within different groups [3]

The goal of the present study - to measure functional language lateralization in healthy right- and left-handers and to test the following hypotheses:
• whether mean LIs between these groups are different
• whether there is a correlation between LI and HQ
• whether there is a higher variability of hemisphere dominance within the group of left-handers

RESULTS

13 healthy subjects (7 female)
6 right- and 7 left-handed
mean age 24 years

No significant correlation
r = .41
p = .16

No significant difference between the groups (F = 1.8, p = .21);
the main effect of the lobe (frontal vs. temporal) (F = 7.2, p = .02)

Frontal lobe (M = .69, SD = .31)
Temporal lobe (M = .34, SD = .36)

Implications
• the present study failed to find difference between mean LIs in the groups of left- and right-handers
• no correlation between HQ and LI was revealed (likely due to the small sample)
• a significant difference in the variability of hemisphere dominance was found, the group of right-handers having more uniformly left-lateralized activation
• overall higher LIs in the frontal lobe suggest that language lateralization within anterior language regions is universally stronger than in the temporal lobe.

STIMULI
Experimental condition:
five-word incomplete sentences with a direct object omitted:
«Yesterday the detective cautiously unlocked the …»
Control condition:
sequences of meaningless syllables of equal length:
«Paaaaaaa paaaaaaaa paaaaa paaaaaaaaaaa …»

SAMPLE
• 13 healthy subjects (7 female)
• 6 right- and 7 left-handed
• mean age 24 years

PARAMETERS & DATA PROCESSING
• 1.5T Siemens Avanto scanner
• a sparse-sampling paradigm
• SPM12 software
• LI were calculated in the LI toolbox [4] using t-weighting of voxels and frontal and temporal lobes masks
• HQ was calculated using the Edinburgh Handedness Inventory [5]

BIBLIOGRAPHY