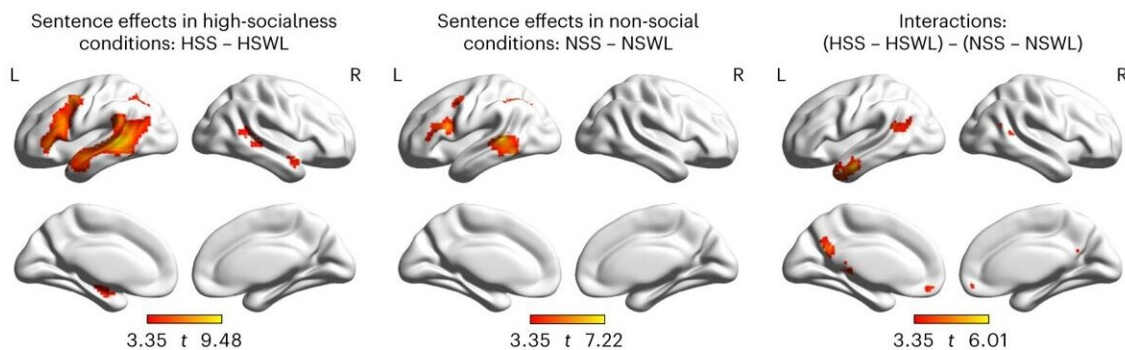


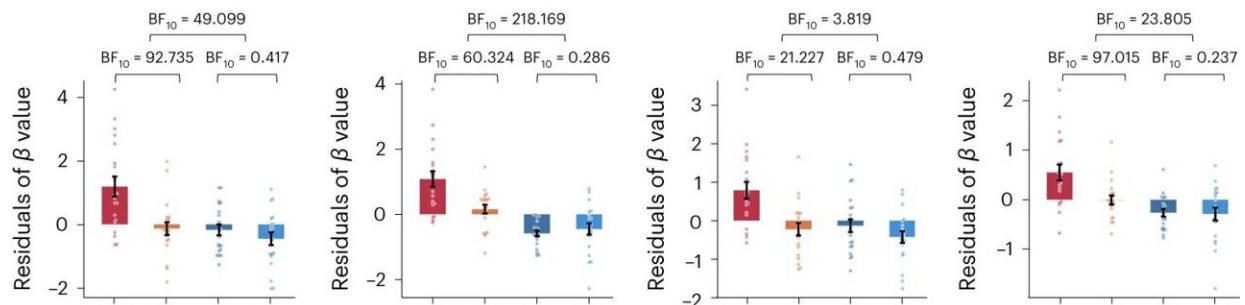
Social vs. language role: Researchers question function of two brain areas

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c Whole-brain results of Experiment 1:



d ROI results of Experiment 1:



Social meaning drives sentence effects in the left vTPJ and lATL (Experiment 1). **a**, Sample materials for each critical experimental condition. For each trial, the stimuli were six words of either high or no socialness. The words formed two short sentences or an unconnected word list. The slashes indicate the word boundaries. Note that although the two sample word lists provided in the figure are both noun lists, one third of the word-list stimuli were verb lists. **b**, The trial structure of the task. In each trial, the participants saw the stimuli word by word and then performed a word recognition task. The experiment used a block

design, with each block consisting of four trials of the same condition. **c**, The whole-brain results (for the full results, see Supplementary Table 1). An interaction between social-semantic and sentence effects was found in the left vTPJ and lATL. The left vTPJ and lATL showed stronger activation to sentences than to word lists in the high-socialness conditions (HSS versus HSWL) but not in the non-social conditions (NSS versus NSWL). **d**, The ROI results (sample size, $n = 20$; for the results of classical parametric tests, see Supplementary Tables 3 and 4). The two plots on the left show the results in the target ROIs defined on the basis of a meta-analysis for the contrast between sentences and word lists²⁷. The two plots on the right show the results in the target ROIs defined on the basis of the contrast between sentences and word lists on half of the individual data. The bars show the mean residuals of the β values with the IES being regressed out, the error bars show the standard errors, and each point shows the data of a participant. The BF_{10} values represent the ratios of the likelihood of the data under the alternative hypothesis compared to the null hypothesis. The brain maps below the bar graphs show the locations of the literature-based ROIs and the group-constrained masks for individual ROIs. All target ROIs show a strong sentence effect in high-socialness conditions, no sentence effect in non-social conditions, and an interaction between social-semantic and sentence effects. Credit: *Nature Human Behaviour* (2023). DOI: 10.1038/s41562-023-01704-8

A research team led by Prof. Lin Nan from the Institute of Psychology of the Chinese Academy of Sciences found that during sentence processing, the neural activity of two canonical language areas—the left ventral temporoparietal junction (vTPJ) and the lateral anterior temporal lobe (lATL)—is associated with social-semantic working memory rather than language processing per se.

The [study](#) was published in *Nature Human Behaviour*.

Language and [social cognition](#) are two deeply interrelated abilities of the human species, but have traditionally been studied as two separate

domains. Both sentence processing and social tasks can evoke [neural activity](#) in the left vTPJ and lATL, suggesting that the function of these regions may link language comprehension with social cognition.

However, previous studies have attributed the activity of these regions in language tasks to general semantic and/or syntactic processing, whereas their activity in social tasks is attributed to social concept activation.

In this study, the researchers tested a novel hypothesis that the activity of the left vTPJ and lATL in language and social tasks are both due to a common cognitive component—i.e., social-semantic working memory.

Using fMRI experiments, they validated that these regions were sensitive to sentences only if the sentences conveyed social meaning. In addition, these regions showed persistent social-semantic-selective activity after the linguistic stimuli disappeared and were sensitive to the sociality of nonlinguistic stimuli. Furthermore, these regions were more tightly connected to the social-semantic-processing areas than to the sentence-processing areas.

The results indicate that the left vTPJ and lATL are not specific to [language processing](#) and contribute to language comprehension through social-semantic working memory.

"Since the 1990s, it has been consistently observed that the left vTPJ and lATL are sensitive to [sentence](#) processing. Therefore, our findings were quite surprising," said Prof. Lin, corresponding author of the study.

These findings are likely to force a major reconsideration of the functional organization of the cortical [language](#) network, and they also make an important new contribution to the field of social neuroscience, according to a reviewer for *Nature Human Behaviour*.

More information: Zhang, G. et al, A social-semantic working-memory account for two canonical language areas, *Nature Human Behaviour* (2023). [DOI: 10.1038/s41562-023-01704-8](https://doi.org/10.1038/s41562-023-01704-8).
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