

# Independent face- and body-evoked fMRI response patterns in human fusiform gyrus during whole-person perception

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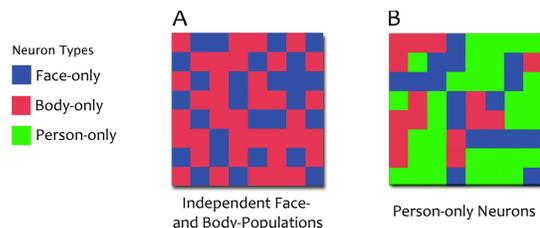
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## Introduction

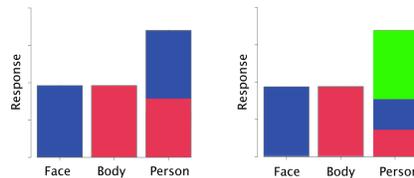
In real life, bodies and faces are most of the time co-occurring and integrated into a whole person. In contrast to this, brain areas were found to be specifically responsive to either faces or bodies. In fusiform gyrus (FG), regions of face- and body-selectivity are overlapping to a great extent<sup>1,2,3</sup>. Are these mechanisms recruited independently of each other when we see whole persons? Or is there a holistic representation for whole persons that implements other neural mechanisms? We aimed to resolve this question by testing if multivariate response patterns to whole persons in FG can be accurately approximated by a linear combination of face- and body-patterns. If face- and body-mechanisms in FG are independently activated, this approximation should work very well. If, however, persons are represented holistically in FG, the synthetic patterns should not model the person patterns well, as these would then mainly rely on the distribution of person-specific neurons.

## How are persons represented?

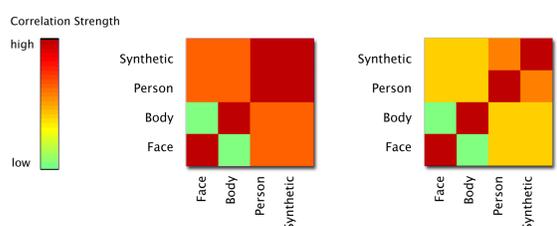
Possible distributions of neurons in one example voxel in FG



Predicted BOLD-responses from the example voxel



Predicted multi-voxel pattern correlations



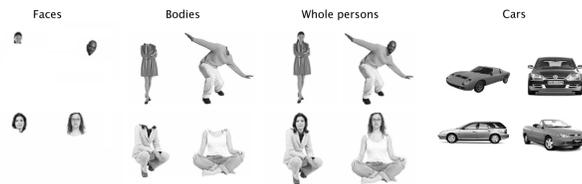
## Methods

**Regions of interest.** Person-selective FG was localized using the person > car contrast. As a control region, also a person-selective part of lateral occipito-temporal cortex (LOT) was localized. Additionally, V1 was used as a retinotopic control area.

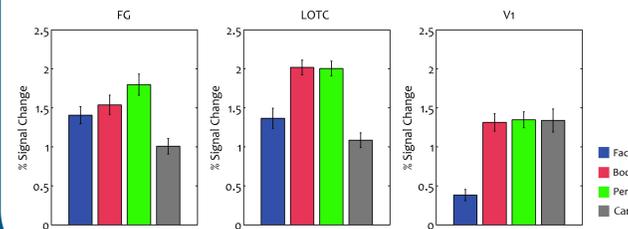
**Synthetic patterns.** For the pattern correlation analyses, synthetic patterns were created by taking each voxel's mean beta-value of the face- and body-condition.

**Optimal coefficients.** In addition, we tested which linear coefficients optimally resemble the person pattern, by varying the coefficients and optimizing the correlation of synthetic- and person-patterns.

## Stimuli



## Univariate results



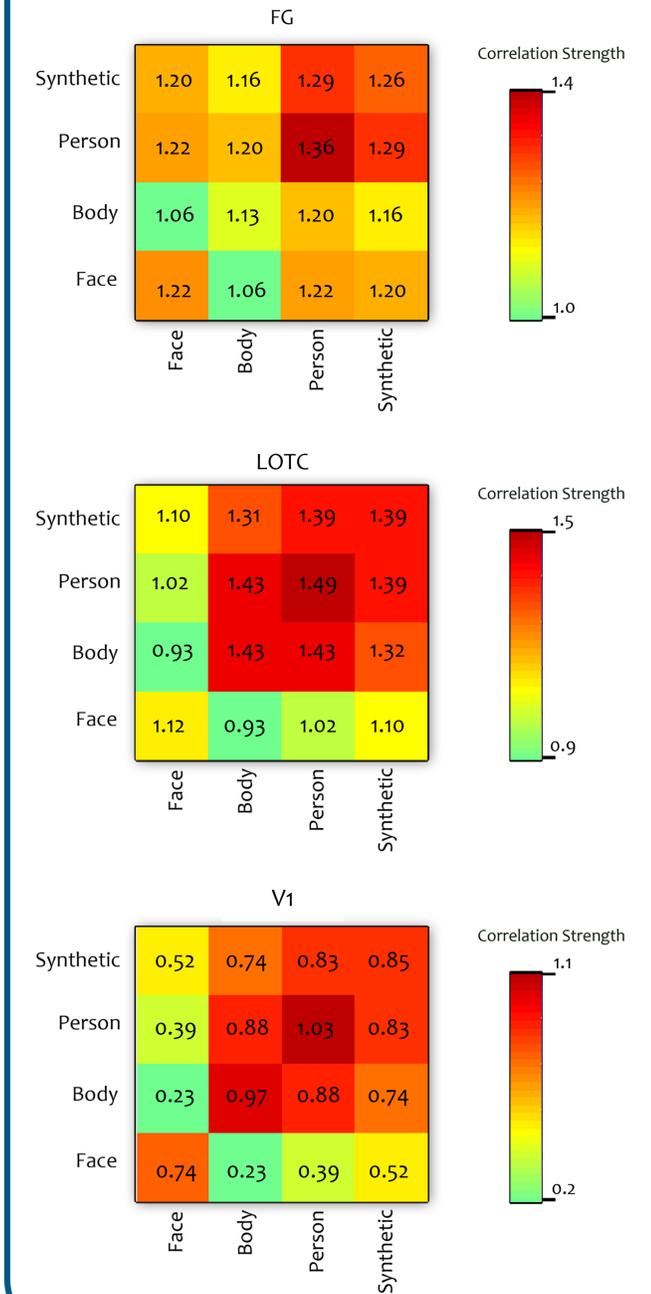
## Multivariate results

**Synthetic patterns approximate person patterns very well in FG.** The correlation of synthetic patterns and body-patterns was higher than the face-person and body-person correlations. Additionally, the synthetic patterns were statistically indistinguishable from the person-patterns (no difference between person-person and synthetic-person correlations).

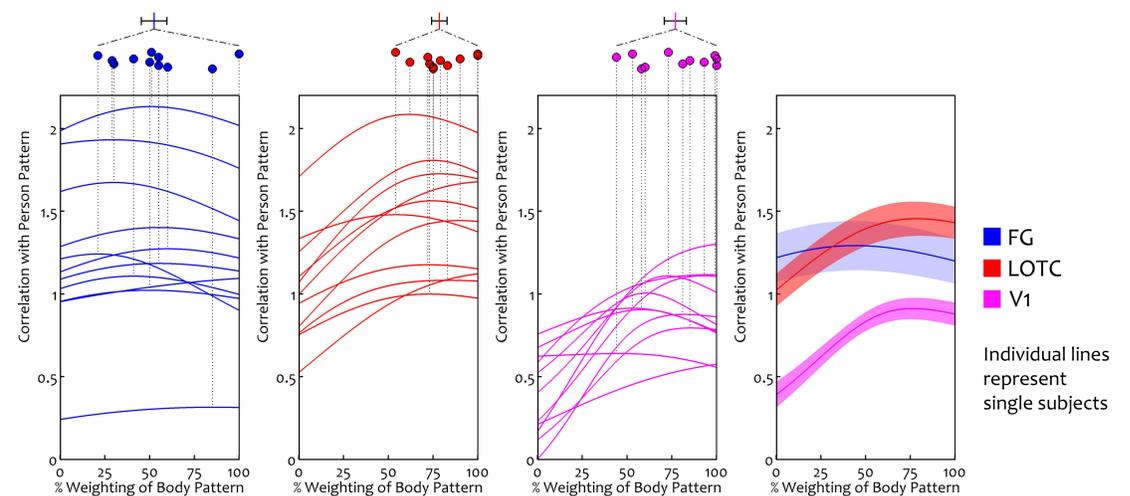
**Synthetic patterns are dominated by body information in LOTC and V1.** Both in V1 and LOTC, the synthetic-person correlation was not different from the body-person correlation.

**Equal optimal coefficients in FG.** When we tested for the optimal linear body- and face-coefficients, we found that exclusively in FG face- and body- information are optimally weighted equally, indicating unique contributions of face- and body-information.

## Pattern correlations



## Optimal synthetic patterns



## Conclusions

Taken together, the results in FG are most in line with a scenario in which person-evoked responses consist of activity in independent face- and body-selective neural populations. We conclude that during whole-person perception such overlapping populations are co-activated, without holistic person representations in FG.

## References

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- [2] Peelen MV, Downing PE. (2005). Selectivity for the human body in the fusiform gyrus. *J Neurophysiol*, 93: 603-608.
- [3] Schwarzlose R, Baker C, Kanwisher N. (2005). Separate face and body selectivity on the fusiform gyrus. *J Neurosci*, 25: 11055-11059.