

Maternal Brain Gain: Changes in neural representations and body perception during pregnancy

ABSTRACT:

Background

The space immediately surrounding our body – i.e. ‘peripersonal space’ (PPS; Rizzolatti et al., 1997) - is important, as it is where we interact with stimuli in the external world. Recent studies have shown that the PPS boundaries are malleable. For example, it has been found that being in proximity to an individual we have previously co-operated with induces an expansion of our PPS towards that person.

Aims

With our study we aimed at investigating whether the PPS changes during pregnancy, a critical stage in life, when extremely rapid changes occur in the body size and shape. As pregnancy advances, the PPS should expand, reflecting an updated mental representation of one’s body that makes external stimuli, initially perceived as being outside of the PPS, to be perceived closer, within the PPS.

Method

To this aim, we tested 37 pregnant women and 19 non-pregnant women three times: at the 20th and at 34th week of the gestational period and 8 weeks postpartum (and at the same time intervals in the control group). To assess the PPS boundaries we used a well-established audiotactile task (Canzoneri et al., 2012) whereby participants’ reaction times (RTs) to a tactile stimulus on the abdomen, were measured while listening to a dynamic sound that seems to start at a location far from the participant and progressively approach the participant’s body. When touches occurred at short temporal delays the sound was perceived far and gradually closer to the participant’s body as the delays increase. As sounds facilitate tactile RTs only when presented close to the body (Serino et al., 2007), we expected RTs to progressively decrease as the sound was approaching. The critical distance where the sound speeds up tactile RTs can be taken as a proxy of the PPS boundary.

Results

By comparing this critical distance across the three time periods we found that whereas at the first and the third testing period no differences in the PPS size were observed between the groups, in the second period, the pregnant participants’ PPS was larger than the controls.

Conclusions

We conclude that during pregnancy our brain adapts to the sudden change in body size, by expanding the representation of the space around us, possibly in order to protect the vulnerable abdomen from bumping against objects.

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Keywords

Pregnancy, Plasticity, Interoception, Exteroception, Peripersonal Space

Published Work:

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Researcher's Contacts:

Dr. Jane Aspell
East Road, Cambridge, CB1 1PT

Email: jane.aspell@anglia.ac.uk

Phone: +44 1223 698 258