**Title**: EEG Measures of Cardiac Interoception in Autism: Correspondence with Self-Reported Interoceptive Confusion and Receptive Language

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**Introduction**: Autistic individuals report various challenges with sensing and interpreting their bodily signals (i.e., interoception), which may contribute to co-occurring conditions including anxiety and toileting difficulties. However, most prior studies of interoception in autism have involved tasks with high language and working memory demands, limiting the ability to measure and understand interoception in individuals with lower language abilities. Neural signatures of interoception, such as the heartbeat-evoked potential (HEP), allow study of interoceptive-related processing independently from accuracy in detecting and reporting these signals. Thus, we examined how HEP related to i) self-reported interoceptive challenges and ii) receptive language levels in autistic versus non-autistic individuals.

**Method**: Our sample included *n*=27 non-autistic (N-AUT, ages 8-56 years, 59% female, 4% non-binary, 82% white) and *n*=34 autistic individuals (AUT, ages 9-51 years, 24% female, 12% non-binary, 79% white). Participants completed a heartbeat tracking task (Fittipaldi et al., 2020) with two conditions: exteroceptive (tracking a heartbeat sound) and interoceptive (tracking one’s own heartbeat). Electroencephalogram (EEG) was acquired with a 128-channel EGI EEG saline cap. An average of 10 frontal channels were used to calculate HEPs, with a 200-500 millisecond time window relative to detected R peaks measured with electrocardiogram. The absolute area under the curve (AUC) was computed and combined across positive and negative deflections within the time window. Interoceptive confusion was measured with the Interoception Sensory Questionnaire (ISQ) and receptive language levels were measured with the Receptive One-Word Picture Vocabulary Task 4th edition (ROWPVT-4). We used separate general linear models to predict HEP AUC for the interoceptive and exteroceptive conditions, using diagnostic group, age, gender, ROWPVT, and ISQ scores as predictors. Models also included a term for group by ISQ interaction.

**Results**: Age, gender, and receptive language levels did not significantly correspond with HEP AUC in either condition (interoceptive or exteroceptive); ISQ scores alone also did not significantly relate to HEP AUC. Interestingly, there were trending differences in HEP AUC by group (N-AUT<AUT, *t* =-1.98, p=0.054) and a significant group by ISQ interaction (*t*=2.35, p=0.023) for the exteroceptive condition, but not the interoceptive condition. Greater HEP AUC during the exteroceptive condition corresponded to higher interoceptive confusion in the non-autistic, but not autistic group.

**Discussion:** For non-autistic individuals, we found that individuals who process their bodily signals more readily when not being specifically instructed to do so (e.g., when being asked to attend to sounds) may have more difficulties with later understanding and interpreting these sensations, reflecting a distinction that interoceptive confusion may be caused by complex factors other than reduced neural processing. Autistic individuals’ interoceptive processing was on average higher than non-autistic individuals in this exteroceptive condition, suggesting enhanced attention to interoceptive cues in autism even when asked to attend to sounds. Though exteroceptive HEP AUC and interoceptive confusion were both higher in the autistic relative to non-autistic group, their dimensional relationship with each other was less clear in the autistic group, suggesting that there may be other factors to consider when interpreting neural correlates of interoceptive confusion. Promisingly, HEP AUC did not depend on receptive language levels in either condition, supporting its potential as a useful implicit marker of interoceptive processing in individuals for whom communication is a barrier to completing behavioral tasks.

**References:** Fittipaldi, S., Abrevaya, S., Fuente, A. de la, Pascariello, G. O., Hesse, E., Birba, A., Salamone, P., Hildebrandt, M., Martí, S. A., Pautassi, R. M., Huepe, D., Martorell, M. M., Yoris, A., Roca, M., García, A. M., Sedeño, L., & Ibáñez, A. (2020). A multidimensional and multi-feature framework for cardiac interoception. *NeuroImage*, *212*, 116677. <https://doi.org/10.1016/j.neuroimage.2020.116677>

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