

## Perception of biological motion in autism spectrum disorders

*Christine M Freitag, Carsten Konrad, Melanie Haberlen, Christina Kleser, Alexander von Gontard, Wolfgang Reith, Nikolaus F Troje, Christoph Krick*

In individuals with autism or autism-spectrum-disorder (ASD), conflicting results have been reported regarding the processing of biological motion tasks. As biological motion perception and recognition might be related to impaired imitation, gross motor skills and autism specific psychopathology in individuals with ASD, we performed a functional MRI study on biological motion perception in a sample of 15 adolescent and young adult individuals with ASD and typically developing, age, sex and IQ matched controls. Neuronal activation during biological motion perception was compared between groups, and correlation patterns of imitation, gross motor and behavioral measures with neuronal activation were explored. Differences in local gray matter volume between groups as well as correlation patterns of psychopathological measures with gray matter volume were additionally compared. On the behavioral level, recognition of biological motion was assessed by a reaction time (RT) task. Groups differed strongly with regard to neuronal activation and RT, and differential correlation patterns with behavioral as well as with imitation and gross motor abilities were elicited across and within groups. However, contrasting with the initial hypothesis, additional differences between groups were observed during perception and recognition of spatially moving point lights in general irrespective of biological motion. Results either point towards difficulties in higher-order motion perception or in the integration of complex motion information in the association cortex. This interpretation is supported by differences in gray matter volume as well as correlation with repetitive behavior bilaterally in the parietal cortex and the right medial temporal cortex. The specific correlation of neuronal activation during biological motion perception with hand-finger imitation, dynamic balance and diadochokinesis abilities emphasizes the possible relevance of difficulties in biological motion perception or impaired self-other matching for action imitation and gross motor difficulties in individuals with ASD.