The Interactive Wearable Toy "+Me", for the Therapy of Children with Autism Spectrum Disorders: Preliminary Results

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Abstract : +me is an experimental interactive toy with the appearance of a soft, pillow-like, panda. Shape and consistency are designed to arise emotional attachment in young children: a child can wear it around his/her neck and treat it as a companion (i.e. a transitional object). When caressed on paws or head, the panda emits appealing, interesting outputs like colored lights or amusing sounds, thanks to embedded electronics. Such sensory patterns can be modified through a wirelessly connected tablet: by this, an adult caregiver can adapt +me responses to a child's reactions or requests, for example, changing the light hue or the type of sound. The toy control is therefore shared, as it depends on both the child (who handles the panda) and the adult (who manages the tablet and mediates the sensory input-output contingencies). These features make +me a potential tool for therapy with children with Neurodevelopmental Disorders (ND), characterized by impairments in the social area, like Autism Spectrum Disorders (ASD) and Language Disorders (LD): as a proposal, the toy could be used together with a therapist, in rehabilitative play activities aimed at encouraging simple social interactions and reinforcing basic relational and communication skills. +me was tested in two pilot experiments, the first one involving 15 Typically Developed (TD) children aged in 8-34 months, the second one involving 7 children with ASD, and 7 with LD, aged in 30-48 months. In both studies a researcher/caregiver, during a one-to-one, ten-minute activity plays with the panda and encourages the child to do the same. The purpose of both studies was to ascertain the general acceptability of the device as an interesting toy that is an object able to capture the child's attention and to maintain a high motivation to interact with it and with the adult. Behavioral indexes for estimating the interplay between the child, +me and caregiver were rated from the video recording of the experimental sessions. Preliminary results show how -on average- participants from 3 groups exhibit a good engagement: they touch, caress, explore the panda and show enjoyment when they manage to trigger luminous and sound responses. During the experiments, children tend to imitate the caregiver's actions on +me, often looking (and smiling) at him/her. Interesting behavioral differences between TD, ASD, and LD groups are scored: for example, ASD participants produce a fewer number of smiles both to panda and to a caregiver with respect to TD group, while LD scores stand between ASD and TD subjects. These preliminary observations suggest that the interactive toy +me is able to raise and maintain the interest of toddlers and therefore it can be reasonably used as a supporting tool during therapy, to stimulate pivotal social skills as imitation, turn-taking, eye contact, and social smiles. Interestingly, the young age of participants, along with the behavioral differences between groups, seem to suggest a further potential use of the device: a tool for early differential diagnosis (the average age of a child