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Improving Theory of Mind skills in Down Syndrome? An Exploratory Study.

Annick COMBLAIN
Coraline SCHMETZ
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Abstract

Theory of Mind includes the ability to attribute mental states (thoughts, emotions, beliefs, desires, etc.) to others, as well as the ability to admit that others' thoughts or feelings may differ from ours (Losh, Martin, Klusek, Hogan-Brown, & Sideris, 2012). In addition, theses abilities imply the use of this knowledge to explain and predict someone else's behavior. It involves the recognition of first-order thoughts ("I think that …") and second-order thoughts ("I think he thinks that…"), the understanding of someone else's visual perspective and the understanding the « seeing leads knowing » principle (Hutchins et Prelock, 2015). ToM is essential to communicate efficiently and more specifically to acquire the pragmatics of language (Losh et al., 2012). Indeed, being able to understand someone else's perspective and to infer his/her knowledge about a situation is an essential skill in any communication and social interaction.

ToM skills do not develop in the same way for all children. More particularly, children with genetic or neurodevelopmental disorders have difficulties with ToM tasks. It is not surprising since we know that their social skills and their interpersonal relations are drastically impaired. The first studies on pathological populations naturally focused on autism, a neurodevelopmental disorder characterized by a notable deficit in social interactions (Baron-Cohen, 1989; Baron-Cohen, Leslie, & Frith, 1985). While these pioneering studies considered the ToM deficit as specific to autism, subsequent studies have found similar deficits in other neurodevelopmental disorders such as intellectual disability (see Cobos & Castro, 2010 for a review). In ToM studies, autistic subjects are generally the target group and children with ID are just considered as a control group so that few researches have been conducted on individuals with ID per se (Giouri, Alevriadou and Taskiridou, 2010).

In our pilot study, we explore the possibility of improving ToM abilities of participants with DS and typically developing children (TD) matched for non-verbal mental age. Participants were assessed with the French adaptation of the "ToM Inventory" before and after a 10-week training session. First, we compared the performances of individuals with DS and TD children on the "ToM Inventory" designed by Hutchins and Prelock (2011) and adapted in French by Nader-Grosbois and Houssa (2016). We chose the "ToM Inventory" because of the inadequacy of traditional ToM tasks for children with DS. Indeed, one limitation of the traditional ToM

tasks is that children's cognitive and language levels can influence performance; so it seems difficult to use them with intellectual impaired individuals such as children with DS (Charman, Campbell & Edwards, 1998). “ToM inventory” developed by Hutchins et al. (2011) makes it possible to bypass difficulties identified in traditional tasks. Moreover, it is designed to be used with young typically developing children as well as with disabled children. Second, we test the training’s effect of ToM prerequisites (adaptation of Gombert et al.’s procedure) on typical and atypical participants on the « ToM Inventory ». Our hypotheses are as follows: (1) according to the delay hypothesis (Thirion-Marissiaux & Nader-Grosbois, 2008), participants with DS will perform lower than TD children on “ToM Inventory”; (2) according to Gombert et al.’s results, both experimental groups will have higher ToM scores on the post-test than on the pre-test while both control groups will have equivalent ToM scores on both post- and pre-tests.

20 participants took part in the study: 10 participants with DS (4 females and 6 males, 8.5 to 18.3-year-old, mean 11.5) and 10 TD participants (3 females and 7 males, 3.11 to 4.8-year-old, mean 4.). The participants were matched for nonverbal mental age measured with the Raven’s “Coloured Progressive Matrix” (Raven, 1998). The French version of the PPVT (EVIP, Dunn, Dunn & Theriaults-Whale, 1993) was also proposed to all the participants. Half of the DS and TD participants were assigned to an experiment group and the other half to a control group. The participants assigned to the experimental group received a 10-week ToM training while the control participants did not receive any specific training. All the participants were presented twice with ToM tasks: before and after the training sessions.

Our results do not support this hypothesis or, more exactly, do not strictly support the delay hypothesis since no significant difference between the DS and TD groups emerges at pretest. This lack of significance can be explained by the very small sample size; maybe with more subjects, the between-group difference would have been significant. Another possible explanation could be the difference of CA between DS and TD groups, participants with DS being significantly older than their TD peers. In accordance with our second hypothesis, trained groups perform significantly better on ToM tasks than untrained groups whose performances remain stable between pre- and post-test. Moreover, children with DS who received training tend to perform better than untrained TD. In conclusion, our results are encouraging as they suggest that, with a specific training, children with DS can improve their ToM skills.

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