Advanced theory of mind in adolescence: Do age, gender and friendship style play a role?

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A B S T R A C T

The ability to recursively infer the mental states of others to explain their complex behavior in ambiguous social situation may be called Advanced Theory of Mind (aToM). The relations between two components of aToM, cognitive and affective, measured on a behavioral level in 151 Polish 13-year-olds and 174 16-year-olds was examined. The role of age, gender and friendship style and its relations to the cognitive and affective aToM was explored. Cognitive aToM was only weakly to moderately related to affective aToM. Across both age groups females scored higher than males. Males' aToM abilities did not differ according to age, but they scored higher in the cognitive aToM than affective ToM. Also, different aspects of friendship style were significant predictors of both aToM abilities. The implications for two aToM components within a gendered social context were discussed.

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Crone and Dahl's (2012) review article on adolescence referred to adolescence as a period of social–affective engagement and goal flexibility. The authors, who are neuroscientists, compellingly argue that there is growing evidence that important changes take place in adolescence, not only in cognitive control but also in social and affective processing during the onset of puberty. Given that these changes are crucial to the understanding of adolescent vulnerabilities, we decided to both broaden and narrow this topic. We narrow this topic by focusing on the developmental perspective incorporating theory of mind approach (Apperly, 2010; Astington & Baird, 2005; Wellman, 2014) and broadened it by taking the decision to study social-cognitive and social-affective processing in both early and middle adolescence. There is a paucity of research on theory of mind (ToM) in adolescence (for exceptions see: Blakemore, 2008; Brizio, Gabbatore, Tirassa, & Bosco, 2015; Dumontheil, Apperly, & Blakemore, 2010; Vetter, Altgasser, Phillips, Mahy, & Kliegel, 2013), so we decided to address this research gap. Moreover, rather than taking a neurocognitive approach, we studied the adolescents' ToM on a behavioral level. We aimed to provide new ToM assessment tools but also to verify if the neurodevelopmental model of ToM development in adolescence (Shamay-Tsoory, Harari, Aharon-Peretz, & Levkowitz, 2010) is adequate when behavioral data are provided. Models that corroborate each other at the behavioral and neuropsychological levels are better suited to explaining any psychological phenomenon (Morton, 2008), in this case advanced theory of mind (aToM).

We begin by shortly reviewing what ToM is and providing justification for our decision to refer to the adolescent's ToM as advanced ToM (aToM). We then go on to explain why we chose to study age and gender differences in aToM development.

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Moreover, inspired by the recent trend favoring a more social contextual approach to the development of ToM (Hughes & Devine, 2015a, 2015b), we also decided to explore not only the role played by age and gender, but also the role of social factors such as friendship style in the development of aToM.

1. Advanced theory of mind

ToM is the ability to infer others’ mental states in order to explain and predict their behaviors within the context of social interactions (Premack & Woodruff, 1978; for review: Astington & Hughes, 2013). Despite over three decades of research on ToM from a developmental perspective, there is still very little research on the social roots of ToM abilities in older children and adolescents (Hughes & Devine, 2015a; Lagattuta et al., 2015). Most researchers focusing on children’s ToM distinguish between two different kinds of competencies, such as early, automatic, spontaneous recognition, as opposed to the later onset of flexible and reflective understanding of mind (for a review see: Astington & Hughes, 2013; Schneider, Slaughter, & Dux, 2015). Moreover, some researchers (Wellman, 2014) have recognized that, in childhood, the emotions and desires of others are understood earlier than their beliefs and knowledge, and a two-system model of development has been proposed (Tager-Flusberg & Sullivan, 2000). On the one hand, neurocognitive studies on ToM in adolescence also emphasize the need to differentiate between the affective as opposed to the cognitive aspects of ToM (Shamay-Tsoory et al., 2010), but on the other, contrary to much childhood research, the affective aspects of ToM are viewed as being more challenging to master as well as developing later than the cognitive aspects.

Advanced or more mature ToM (aToM) is defined on the basis of the tested participants being older in age and also by an emphasis being placed on the increased role played by recursion and interpretation in the process of social understanding, in particular the understanding of complex social situations. As Brizio et al. (2015) emphasized, false belief tests and even tasks prepared for older but atypical populations, like the Strange Stories Task (Happe, 1994) are not valid tools for measuring advanced ToM due to the ceiling effect. Dumontheil et al. (2010) proposed using a “Director Task”, previously used as a measure of referential communicative abilities, and Bosacki and Astington (1999) utilized Ambiguous Social Stories as tasks in which complex social situations and non-direct, recursive communicative cues are required to analyze and interpret the stories. Advanced ToM is therefore based on recursion conceived as the ability to reason about second and higher-order beliefs (Miller, 2009, 2012) and on the ability to interpret social actions conceived as the ability to understand multiple perspectives within a communicative situation. Carpendale and Chandler (1996) who tested for understanding of ambiguity were among the first to use the term interpretative ToM, describing it as a more mature or advanced ToM ability that differs from simple false belief understanding (e.g. when someone receives a present yet starts to cry; such an unexpected emotion requires a more complex interpretation).

Advanced ToM abilities are needed in adolescence in complex and ambiguous social situations, especially when they require differentiation between cognitive and affective mental states. As opposed to the recognition and comprehension of simple emotions by young children, in adolescence there is a need to infer complex, belief-based social emotions that are always embedded in social contexts and in other people’s life histories (Hoffman, 2001). This idea corroborates Shamay-Tsoory et al.’s (2010) suggestion that in affective ToM, empathy and cognitive ToM are integrated, and also that affective ToM, when complex reasoning about social emotions is needed, develops later than cognitive ToM. Moreover, Sebastian et al.’s (2012) study showed that adults outperformed adolescents in understanding emotions in social situations. Furthermore, Vetter et al. (2013) and Bosco, Gabbatore, and Tirassa (2014) provided evidence that developmental changes in affective advanced ToM abilities take place in adolescence. To our knowledge, current, neurodevelopmental research with adults (Corradi-Dell’Acqua, Hofstetter, & Vuilleumier, 2014) also supports the idea that the affective and cognitive aspects of ToM should be differentiated. Moreover, studies on the “social brain hypothesis” (Blakemore, 2008; Moor et al., 2012) also showed that different regions of the brain were active during some theory of mind tasks (i.e. Reading the Mind in the Eyes) when adolescents and adults were tested. However, there is still a lack of research attempting to differentiate between the affective and cognitive components of ToM presented in adolescence, and so, by implication, those presented in advanced ToM abilities, especially on a behavioral level, when complex inferences about these two kinds of mental state are needed.

Given the implications of Shamay-Tsoory et al.’s theory (2010), we assumed, for the purposes of the present paper, that cognitive aToM processes should be distinguished from affective processes, and also that cognitive aToM is a developmental prerequisite for affective aToM in adolescence. We also assumed that affective aToM requires intact processing of empathy or the ability to share and understand the emotional states of others (Singer, Critchley, & Preuschoff, 2009). These premises are important, as they enabled us to propose two different tasks, one to measure each aspect of aToM, and also to hypothesize that affective aToM is conceptually distinct and more complex than cognitive aToM.

2. Factors influencing aToM development

As previously noted, Hughes and Devine (2015a, 2015b) emphasized that contemporary research on ToM should be directed more towards finding the social factors responsible for the individual differences we see in ToM and aToM, in particular, differences related to gender. Furthermore, more biological approaches to ToM development, like, for example, Baron-Cohen’s (2002) “extremely male brain” theory, stress that boys and girls may differ in their ability to infer mental states. The gender aspect is important because some studies show that girls possess higher levels of ToM, in particular, ToM emotional understanding (Białecka-Pikul, Rynda, & Syrecka, 2010; Bosacki & Astington, 1999; Cutting & Dunn, 1999; Devine &
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