Three-year-olds’ theories of mind are symbolic but of low complexity

Graeme S. Halford1,2* and Glenda Andrews3

1 School of Applied Psychology, Griffith University, Brisbane, QLD, Australia
2 School of Psychology, University of Queensland, Brisbane, QLD, Australia
3 School of Applied Psychology, Griffith University, Gold Coast, QLD, Australia
*Correspondence: g.halford@griffith.edu.au

Edited and reviewed by:
Gary Jones, Nottingham Trent University, UK

Keywords: theory of mind, symbolic processes, complexity, implicit, explicit knowledge

Rhodes and Brandone (2014) have shown evidence of limited theory of mind in 3-year old children. The study was based on a false belief procedure in which an observer [E1] saw a toy hidden in location 1, then it was moved to location 2. E1 observed the move in the true belief (TB) test but not in the false belief (FB) test. Then the child was assessed for understanding of E1’s belief about the toy. In the FB test E1 should falsely believe the toy was still at location 1, whereas in the TB test E1 would know the toy was at location 2. In the action condition the child was asked to open the door where E1 last saw the toy and either E1’s representation of the location: retrieval action, or E1’s representation of the location: awareness of the toy’s location. Either way, it can be performed by the child’s representation of the location: ternary relational processes which is one possible reason why success is usually not observed until 5 years, whereas 2-year olds exhibit binary relational theory of mind as assessed in the verbal condition entails ternary relational processes which is the cognitive complexity of the verbal FB task, as demonstrated by Andrews et al. (2003). The false belief test entails relating three variables; where the toy was hidden first, the nature of the transformation, and the observer’s representation of the toy’s location. This is ternary relational and successful performance was associated with other ternary relational tasks including transitive inference and class inclusion. Therefore, it would be expected that 3-year olds, even though they correctly answered the three control questions, would not succeed in the verbal false belief test because they could not construct a cognitive representation that integrated the three relevant variables.

Why then could they pass the action false belief test? We propose that the action test could be passed by the simpler process of representing where E1 last saw the toy. In the FB test E1 last saw the toy at location 1, and therefore will go there to retrieve it. However, in the TB test E1 last saw the toy at location 2, and therefore will attempt to retrieve it there. Both these responses would yield correct scores, and the proportions correct indicate children recognized a link between E1’s movement (which door E1 will enter by) and where E1 last saw the toy. Notice however that it does not unequivocally demonstrate that children recognize E1’s awareness of the toy’s location. Either way, it can be performed by the child’s representing a relation between the location where E1 last saw the toy and either E1’s retrieval action, or E1’s representation of the location:
Child’s representation (E1 last-seen location; E1 retrieval-action)

Or

Child’s representation (E1 last-seen location; E1 representation-of-location)

In either form this is a binary relation which is easily within the processing capacity of typical 3-year olds (Andrews et al., 2003).

An explanation based on the verbal nature of the explicit false belief test is implausible because the children passed the control questions which were also verbal. It also begs the question why verbal processes are harder. Our suggestion is that relational complexity affects both reasoning and language (Andrews et al., 2006) so both verbal and action performances will be subject to complexity effects. The question: “Where does E1 think the toy is?” would elicit a more complete representation that more closely resembles the representation elicited by traditional false belief tasks in which three variables are related:

Child’s representation (where E1 saw toy hidden; nature of transformation; E1’s representation of location).

We agree that the action performance is consistent with implicit cognition, but we also suggest it is symbolic, and it is performed correctly because it is structurally simple. Relational complexity has been found to be a powerful explanatory concept in infant, child, adult and animal cognition (Halford et al., 2007, 2014). In the context of theory of mind it implies that implicit (action) theory of mind should be related to many other tasks of similar complexity, including in other domains such as the balance scale and categorical syllogisms. Explicit theory of mind should be related to other ternary relational tasks such as transitive inference and class inclusion.

REFERENCES


Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Received: 23 May 2014; paper pending published: 10 June 2014; accepted: 13 June 2014; published online: 30 June 2014.
Citation: Halford GS and Andrews G (2014) Three-year-olds’ theories of mind are symbolic but of low complexity. Front. Psychol. 5:682. doi: 10.3389/fpsyg.2014.00682
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