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The Theory of Mind as a mental mechanism of communicative success in preschool children

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Abstract

This paper shows the results of experimental research into the mental basis of children’s communication from the point of coordinated activity between its members. A theory of mind (ToM) represents a mechanism of social cognition that provides communicative success between partners through understanding each partner’s mentality. The following aspects of communicative success were selected for estimation: understanding of communication partner’s mentality, success in constructing narratives and understanding of a sequence of events in another partner’s retelling. The participants of the research were 50 children aged 4 and 6 years. The data showed the coordination between ToM development and selected communication aspects. Children of different age groups demonstrated specific skills in understanding their communication partner’s mental phenomenon depending on the context of communication tasks. We obtained arguments for the statement that the success in realizing the functions of an agent and a recipient is based on understanding one’s own mental mind and that of the Other. Also it provides coordination to both partners in the communication process.

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Key words: theory of mind; social cognition; children communication; communication partner; communicative success

1. Introduction

Successful cooperation in society suggests that communication partners understand to some extent each other’s mental world, the partner’s mental suggestions about a situation and the object of communication, his readiness and intent to share information. Learning the cognitive mechanisms that form the basis of a communication process is the key to understanding the principles of social cognition in early childhood.

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The ToM approach demonstrates its productivity in studying social cognition processes and achieving social competence [1]. Some researches point out that the transition to a higher level of ToM development is followed by significant changes in children’s social process: narrative capabilities [2],[3], manipulative behavior [4], assessment of social skills by teachers [5], peer popularity [6]. Being the basis for singling out the principles of social communications, ToM makes it possible to analyze and predict success in everyday communication.

This work is based on the hypnosis that the formation of different aspects for successful communication is connected to ToM development (understanding one’s own mental mind and that of the Other). Communicative success acts as a condition for achieving communication purposes that is determined with a possibility to understand one’s own mental mind and that of the Others and also to mark subjective characteristics which are to coordinate one’s behavior in accordance with one’s communication role.

2. Method

The participants of the research were 50 children attending Moscow kindergartens. The children sample was divided into two age groups – 4 and 6 year olds, each group consisting of 25 children. The research included two blocks of methods. Block 1 estimated ToM development and included different types of tasks: understanding of false beliefs, understanding of emotions, intentions, the difference between the animate and the inanimate, mental and physical reasons for an event, a sense of humor. Block 2 was designed to estimate communicative success in preschool children. The following aspects of communicative behavior were pointed: understanding of communication partner’s mentality, transmission of messages focused on the recipient’s knowledge level (narrative capabilities) and understanding of events according to the Other’s description. The author’s following methodological tasks were developed and approbated to estimate the above values:

- **The Partner choice method** estimated understanding of differences between the mentality of animate and inanimate partners (pseudo partners). A child had to choose a partner in order to solve a communicative task (“Who will not tell the secret to others?”). The following partners were given to choose from: a physical object (a ball), a humanlike partner (a teddy-bear) and another child. At the experimenter’s request the children explained their choice demonstrating a variety of mental conditions attributed to each partner and the ability to predict results of their action.

- **The Event Description method** assessed the success of an information agent. A participant receives a story with one missing element (e.g. “A kitten is sitting near a hat” and “The hat is moving; the boys are running away from the hat”). It is necessary to determine causal links and retell the event to the partner depending on his knowledge level. With the absence of an integral literary example, the description appeared to be a productive task. The most important thing here was the question of meaningful novelty for the recipient. The experimenter assessed the narrations on the strength of the following characteristics: informational content (the information was transmitted insufficiently, partially or fully) and a meaningful specification of the text (fragmentary, short, detailed retelling or with the author’s additions).

- The method of understanding an event by description estimated the success of an information recipient. After listening to the story a child was asked a number of comprehension questions. They were assessed on the basis of the following characteristics: (insufficient, partial or complete comprehension).

The research procedure was organized in a special cyclic order enabling each child to take part in a communicative task both as an agent and as a recipient (a storyteller and a listener) [7].
3. Results and discussion

3.1 ToM development

According to the results obtained the ToM level in children aged 4 and 6 years varies dramatically (understanding of false beliefs \( \varphi = 2.701, \text{ with } p \leq 0.01 \)). While estimating the concurrence of development in different ToM aspects we found similar age-specified dynamics and correlated links which demonstrate interaction in the formation of different abilities of mental understanding. The ratio of internal reliability calculated for seven ToM methods was equal to 0.72 (Cronbach’s alpha= .72); meanwhile the most number of links belongs to the understanding of false beliefs, emotions and humor.

3.2 Understanding of a communication partner’s mentality

The analysis of perception of communication partners’ mental characteristics allowed description of specific differences in four-year-old and six-year-old children. It was found that when choosing a partner from animate and inanimate objects in order to keep their secret four-year-olds were more likely to demonstrate the egocentric model of choice, they chose another child as a partner (i.e. partner similar to them) (\( \varphi = 2.075, \text{ with } p \leq 0.05 \)). More than half of the four-year-old group chose an animate partner (52%) and 40% chose a teddy-bear. Centration on the attribute of animation at this stage doesn’t allow children to consider all the terms of the task and, according to the results, is due to the low values for all the ToM components (Table 1). On the contrary, the six-year-olds demonstrated a tendency to choose inanimate partners (32% for a ball and 44% for a teddy-bear). Participants of this age described not only external evidence related to the mental qualities of the objects, but also their behavioral characteristics that were important for the situational context (e.g. “a friend can forget and tell everyone the secret”, etc.). Children who chose a humanlike partner (joining the game) had higher ToM values (differences in the total value - \( U = 114, \text{ with } p \leq 0.01 \)).

Table 1. Correlational links between the choice of partner and the Theory of Mind tasks.

<table>
<thead>
<tr>
<th>Choice of partner</th>
<th>Choice of partner</th>
<th>Choice of partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a physical object)</td>
<td>(a humanlike character)</td>
<td>(another child)</td>
</tr>
<tr>
<td>Understanding of false beliefs</td>
<td>-</td>
<td>( r = 0.41, \text{ with } p = 0.01 )</td>
</tr>
<tr>
<td>Understanding of the animate and the inanimate</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Understanding of mental causality</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Understanding of physical causality</td>
<td>( r = 0.33, \text{ with } p = 0.01 )</td>
<td>( r = 0.32, \text{ with } p = 0.01 )</td>
</tr>
<tr>
<td>Understanding of humor</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>«Theory of Mind» (total value)</td>
<td>-</td>
<td>( r = 0.46, \text{ with } p = 0.001 )</td>
</tr>
</tbody>
</table>

The age-related dynamics in understanding the communication partners’ mentality manifests itself in the fact that the four-year-olds perceive their partner based on his humanlike characteristics which are necessary to make contact. Meanwhile the six-year-olds are able to predict events basing on the analysis of their communication partners’ mentality and taking into account a specific social task, so they choose an object incapable of transferring information.

3.3 Specifics of constructing narratives
After selecting several levels of message informativity we received results that demonstrated increased success in children of 4-6 years of age. We found out that four-year-olds understood the cause-effect chain of events worse and transmitted to listeners shorter and less informative messages, less frequently they marked causality when constructing a narrative ($\varphi=1.725$, with $p \leq 0.05$). When retelling events with a missing element the children often made only a factual description of the beginning and ending of the story that prevented the listener from drawing a complete picture of the event. The six-year-olds provided more detailed descriptions pointing out the causes of events, characters’ mentality; also they made their messages clearer to the listeners due to a higher meaningful specification of the text. The empirical values obtained indicate a relationship between narrative abilities and ToM. When estimating the informativity of event description for the listeners we discovered a connection with the ToM total value as a tendency ($r=0.24$, $p=0.09$), the highest correlation appeared in line with the understanding of false beliefs.

3.4 Coordination of participants in the communication process

The analysis of the correlation between the success of an agent and a recipient showed a correlational dependence between the informativity of descriptions and the understanding of events by a listener ($r=0.47$, with $p=0.01$). Understanding of events by a recipient after description clearly varied in groups of the low and high levels of the agent’s success in transmitting messages ($U=66$, при $p=0.002$). Moreover, it was found out that the overall ToM performance was related to the understanding of messages following their description by the other partner ($r=0.359$, with $p=0.02$ and $r=0.380$, with $p=0.01$ for different types of tasks). Success in understanding the partner’s messages was due to the possibility of estimating his knowledge and mental characteristics. In this case we can consider ToM as a component mediating the success of communication: understanding of one’s partner’s mind allows creation of messages taking into account his knowledge level and helps the recipient to interpret these messages correctly.

4. Conclusion

In this research we tried to examine a communication process as a real and multidimensional interaction between partners. The ToM approach makes it possible to consider children’s communication in a new way and to explore internal psychological mechanisms of communication, to perceive success as a regular consequence of a child’s mental development. The mental basis of communicative success was investigated not only through analyzing a partner’s individual characteristics, but also through achieving communication purposes. The age-related dynamics found in the development of separate ToM components can also manifest itself in the making of successful narratives construction and understanding messages described by another. Children who understand different mental phenomena better, are more likely to reach understanding with other communication partners, i.e. they can achieve greater communicative success. At the age of 4 years fragmentary development in understanding different mental phenomena refers to the lower values of communication. The perception of a communication partner was based on a primary analysis which made it impossible to predict the result of communication. In most cases informative and meaningful specification of messages was insufficient for a recipient to understand the information. At the age of 6 years, a qualitative leap in ToM development occurs leading to a deeper understanding of other people's mental basis. It was realized in the choice of more effective communication strategies and in the transmission of messages that corresponded to the partner’s knowledge level. These findings raise new questions about realizing capabilities for understanding mental states in the area of common social tasks. Данное направление исследований является актуальным, так как позволяет описать ментальный механизм, предсказывающий успешность социальных взаимодействий человека. This line of research is highly relevant as it enables to describe the mental mechanism that predicts the success of man’s social communication.

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References


