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The script model in relation to autism

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Abstract The primary purpose of this study was to investigate autistic children's scripts for social routines. Scripts specify familiar events in terms of who does what, when, to whom, and why. Scripts are verbalizations of mental event representations, containing and organizing generalized knowledge of how the world works. Scripts are presumed to be of vital importance for the development of shared meaning, communication, and social behaviour. In this study, children with autism were asked to explain well-known social routines, such as how you shop in a supermarket, make a cake or celebrate a birthday. The

scripts of the 12 children with non-retarded autism were compared to scripts of matched normal control children. Despite the fact that all of the participating children with autism had an IQ above 90 and a mental age between 8 and 14, a significant difference in autistic and normal control children's ability to generate scripts for familiar social routines was found. The results are discussed in relation to the same children's ability to pass theory-of-mind tests and their verbal intelligence.

Keywords Non-retarded autism – script – theory-of-mind – verbal IQ

Introduction

Verbal IQ has repeatedly been demonstrated to be highly correlated with theory-of-mind skills (3, 4, 13, 15) which could also be the case with scripts. Understanding the meaning of other people's behaviour obviously requires common knowledge of the situations in which the behavior takes place. We take for granted that people behave in certain ways in certain situations. If we did not know how a particular situation usually takes place in our culture, we would be unable to interpret the motives of other people's actions. The need to know how knowledge about familiar social routines is organized in children with autism is an argument for using the script-model from cognitive psychology. From a theoretical standpoint, the script-model (10, 12) appears to be obvious in relation to autism. Katherine Nelson (12, p. 6) writes about the model: "The central construct is the idea of situational

models that represent familiar experiences. Such cognitive models provide cognitive context, the context that is operational for the individual at any given time. The child acts within situations and activities, but the direction of that action is provided by the applicable internalized model of the situation (what fits from previous experience) in conjunction with specific present features of the situation (who, what, where, etc.). Together, these provide the cognitive context for action, and for the interpretation of the actions of others". At the beginning, the child's models are assumed to be representations of familiar, significant, and repeated events. In time these become generalized into the elaborated child world model that includes people, places, and a variety of activities (general event representations, here called mental event representations). The script model presumes correspondence between the structure in the narrated script and the mental event representation.

When I have to buy something in a supermarket, I first enter the shop. Then in there I take a basket, and find the groceries I want. The groceries I put in the basket. Then I find the money and go to the cashier and pay for the groceries. When I have paid for the groceries I put them in a bag that I have brought, and put the basket back. Finally I go out of the supermarket with the groceries in the bag.

Below is an example illustrating the correlation between script and theory-of-mind. It comes from an initial interview with one of the children with autism, an 11 year old girl:

(What happens when you have music lessons)
But I am not having that today!
 (no, but what happens, when you have?)
But why can't you wait and come along on Thursday?
 (can't you tell me now?)
It's because.. because I don't have anything to do with those matters on the days when I am not going there.
 (Can't you tell me although you are not going there today?)
Then come again on Thursday!
 (No, won't you please tell me today?)
No.
 (You can tell me what you usually do when you have Music lessons)
But, - because I want to wait until Thursday! Are you coming then?
 (No, I am not)
Why aren't you coming?
 (I'm not, and I won't know it, if you won't tell me today)
Then you must come on Thursday
 (I can't, won't you tell me now?)
What is your work?
 (I teach)
Where?
 (At the university)
Then don't you know the things you do in a school?

This child with autism demonstrates theory-of-mind of first order. She wonders what the interviewer knows, but she needs help to realize that the interviewer wants to know what she knows, which indicates that she does not master second order theory-of-mind. In contrast, a 14 year old child with autism demonstrates second order theory-of-mind. After the first few questions, he asked: Do you want to know what an autistic boy like me thinks about such things?

Discussion

This study shows that only half of the scripts given by the non-retarded autistic children fulfill the minimum criterion for simple scripts, in spite of all of the autistic children having a mental age between 8 and 14 and an

IQ above 90. In comparison with the group of matched normal control children, the results show that the group of non-retarded children with autism have significantly fewer well-organized scripts for familiar social routines.

The autistic children were individually matched to the control children on verbal mental age, yet to ensure a match, the more intelligent control children were 1 1/2 years younger. As a result the autistic and control groups differed significantly on verbal IQ, but not on performance IQ. When the effect of verbal IQ on the experimental measures was controlled, the significant difference between the groups disappeared. The situation may be similar to that of theory-of-mind, where a high correlation between verbal IQ and theory-of-mind repeatedly has been demonstrated. This finding makes the interpretation of the results more difficult. A control group of children of the same age and matched in terms of verbal IQ would have been a better control for the influence of verbal IQ on the results.

The biggest difference in the verbal part of the WISC was noticed in the comprehension subtest, which is in accordance with earlier results concerning the test profiles of children with autism. It has often been demonstrated that it is precisely comprehension that is most affected in autism (16, 17). As a test of social reasoning, comprehension has many similarities to the script interview, which might also explain the correlation between verbal IQ and script-performance.

In the young child, mental event representation are presumed to be of vital importance for the development of shared meaning between child and caretaker and, thus, for the development of language and communication (9, 11). A connection between verbal IQ and scripts is not surprising and may be a result of the fact that they are both dependent on an ability to form mental event representations.

A significant difference was also found between the groups on second order theory-of-mind, though not on first order theory-of-mind. In this connection, it is of special interest that Happé (5, 6) found a correlation between the ability to solve theory-of-mind tasks and comprehension in the verbal portion of the WISC. This is interesting because of the aforementioned similarity between what is asked for in script interviews and in comprehension sub-tests.

In conclusion, it is possible that the deficits found in the scripts of autistic children are connected with their lower verbal IQ. The results of the tests for second order theory-of-mind and comprehension could, however, also be interpreted in such a way that deficits in these fields, as well as deficits concerning scripts from children with autism, are due to a lack of ability to form mental event representations, which is a hypothesis that demands further study.

It is clear, however, that the children in the autistic group have great difficulties in giving well-organized

scripts for everyday routines. The cognitive model may replace a supportive perceptual context and, thus, make the child capable of independent thoughts while simultaneously supporting the interpretation of other people's actions (14). Therefore, one must be aware of the specific consequences the lack of ability to generalize event

memory may have on children. If one cannot create cognitive models for familiar everyday situations, one cannot share in context and participate in our culture.

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