Analogical Reasoning in Subjects with Autism, Retardation, and Normal Development

Taffy Reed

The ability to integrate information is an important aspect of cognitive development. Piaget (1950) and others have seen an increase in this ability as marking important progress in cognitive development. Frith (1989), on the other hand, proposed that this is an area of weakness for people with autism and suggested that such a deficit could provide an explanation for the characteristic symptoms of autism. As a test of the hypothesis that people with autism had difficulty in integrating information, the performance of subjects with autism was compared with that of subjects with retardation and normally developing subjects, matched for verbal age and sex, on four analogy tasks. It was predicted that control subjects would perform significantly better than autistic subjects on these tasks. There was a complex pattern of results; however, it was apparent that there was a tendency for the autistic subjects to have greater difficulty with analogies tests than control subjects. It was suggested that autistic people have an impaired ability to integrate stimuli and thus have difficulty in perceiving relationships such as those depicted in analogy tasks.

KEY WORDS: autism; analogical reasoning; cognitive development; integration.

INTRODUCTION

Several theorists have depicted an increase in the ability to integrate information as an important factor in cognitive development (Case, 1992; Halford, 1987; Piaget, 1950). Piaget (1950) demonstrated that one of the characteristics of young children's thinking was that they could focus on

1University of Colorado Health Sciences Center, Department of Psychiatry, 4200 E. Ninth Avenue, Box B148, Denver, Colorado 80262.
only one aspect of a problem or situation at a time, and he proposed that one of the major characteristics of intellectual development was the growth of the ability to "decenter" (i.e., to move one's attention from the aspect of the situation which first captured it to examine other aspects of the problem). The prime example of the young child's limited focus is in Piaget's classic conservation experiments. The young, nonconserving child considers only one aspect of the materials presented to her (for example, the height of the liquid in the containers) and draws an erroneous conclusion from that limited information. As development proceeds, the child is able to consider both the height of the liquid and the width of the container and to combine this information into a more accurate solution.

Case (1992) proposed that the mechanism allowing development of decentering was a growth in attentional scope and control, which gave rise to an increase in the ability to selectively attend to multiple aspects of a problem and to flexibly shift attention from one aspect to another. He gives an example, from Piaget, of how an increase in attentional capacity allows children to gradually increase the number of informational elements they integrate into their solution of the balance beam problem, leading to the development from early solutions based on only one aspect of the problem to more sophisticated solutions which take into account multiple aspects.

Halford (1987) also proposes a model of cognitive development organization, which outlines how children progress from simple to increasingly complex integration of information. He defines four levels of cognitive organization which require different orders of integration of information. "Element mapping" requires that subjects understand a simple one-to-one correspondence between elements; an example of operating at this level is matching to sample or learning verbal labels for objects. The next level is "relational mapping," which requires the child to take into account two elements and the relation they bear to each other. Halford demonstrates this level with a diagram showing a short and a tall person and a short and a long stick. The two sets of pictures can be seen to have a relational similarity to each other as the relation between the tall and short person is the same as that between the long and the short stick. (The elements of the two sets do not need to have any similarity except for the relational one.) The third level in Halford's hierarchy is "system mapping." This level requires the child to integrate systems of elements and relations. What is important at this level is that the child is able to understand that the two systems operate in ways that can be consistently mapped into each other. For example, a common analogy is to compare society to the body. Clearly, there is no direct similarity between elements of the body and the