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Abstract. Age judgments of human figures by children, ranging in age from 3 through 9 years, were investigated. The stimuli consisted of 4 different male figures drawn according to typical physical characteristics of the middle-aged adult, adolescent, child, and infant. The figures were reproduced in 2 sizes and were matched in all possible pairings. *Ss*' accuracy in age judgments increased steadily over the 7 age levels. The errors of young *Ss* were primarily due to a figural-size response set. Older *Ss* made increasing use of other physical features in making their judgments. Implications of these findings were discussed with references to the theoretical framework of Piaget.

The student of child psychology with an interest in the history of his discipline can rather quickly attest to the fact that many of his early predecessors held rather peculiar notions as to what the child is all about. From antiquity until up to perhaps the beginning of the 20th century, the child was viewed more or less as a miniature adult; he was seen as essentially the same as the adult except that he is smaller, weaker, and a bit more stupid. Not until the child began to be studied by clinical psychologists in the early part of this century did these attitudes begin to change. These men, perhaps also guided by the insights of the peripatetic G. Stanley Hall, began to realize that the very young human being was a creature very different than the grown-up adult. They thus began the study of the child *as a child*, an organism unique unto himself, with his own unique forms of psychological functioning. Nevertheless, true understanding of the child was slow to develop in this country. Perhaps this developmental torpidity can be explained by the predominance of the intrepid learning theorists during this period, who studied the learning process in many kinds of organisms, including children, but also operated under the general mental set which assumed that all forms of learning were a matter of S-R connections. The fruit of this line of research was summarized by Norman Munn in Carmichael's 1954 volume, *Manual of Child Psychology*; Munn concluded, in effect, that there are no learning processes which are unique in children, as opposed to animals or adults.

Within recent years there has been an upsurge of what is generally called "cognitive psychology". The unquestioned giant of the cognitive approach to child study is Jean Piaget of Geneva, who has been writing voluminously about the child for 45 years. Only recently has his work been given the attention in this country

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it deserves. Cognitive psychologists, lead by Piaget in Europe and Bruner and many others in this country, have dramatically demonstrated that the child indeed is quite a different creature than the adult human being. They have suggested that the child's thinking can be conceptualized as passing through a number of stages, each of which represents a new way in which the child views his world. The child's attempts to construct a picture of his world, given his limited maturity and faulty logic, produce some rather peculiar responses (at least as seen by adult). These peculiarities are revealed in his verbalizations about the phenomena occurring around him. The many studies of conservation, moral reasoning, causal thinking, concept attainment, etc., have increased our understanding of these changes in the child's thinking.

An observant parent can notice many aspects of faulty and immature representations his child builds in order to make sense out of his world. One of these pertains to the child's judgment of the age of other people. It seems that sometime during the first two or three years of life the child becomes aware that there is a correlation between people's age and their physical size. From then on until sometime during the school years it seems almost impossible for him to disentangle the correlation. Thus, the larger of two persons must of necessity be the older, and the larger one is, the older he must be.

It was the intent of this study to examine judgments of age by children. At what age can the child accurately determine the older of two persons before him? Indeed, is the size of the person the salient dimension in early judgments of age? At what age do other characteristics start to be noticed in age judgment? These and similar questions were our primary interests.

Method

Subjects. *S*s were children of ages 3 through 9 years who were enrolled at the Child Development Laboratory, operated by Iowa State University for the purpose of teacher training programs. In general these children are of above average intelligence.

Nine *S*s from each age group were tested (N=63), with male-female *S*s divided about equally for each age level.

Stimuli. Four drawings (male adult, male adolescent, male child and male infant) were made by a local artist (Fig. 1.). The figures were drawn as clothed with a towel around the waist to facilitate observation of relevant physical cues. The drawings were then reproduced in two size dimensions, 3½ in. high and 5½ in. high. Thus there were 8 figures making a possible 28 paired comparisons. An 8 in. x 12 in. picture of each of the 28 pairs was made. The 28 stimulus cards were varied randomly as to both order of

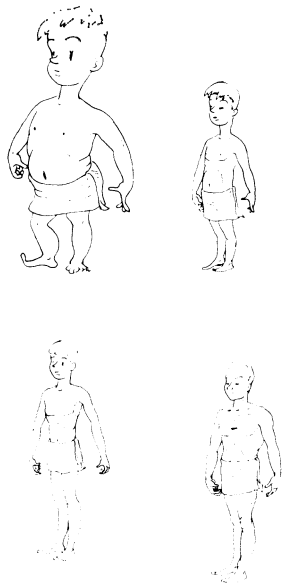


Fig. 1. Stimulus figures used in this investigation.

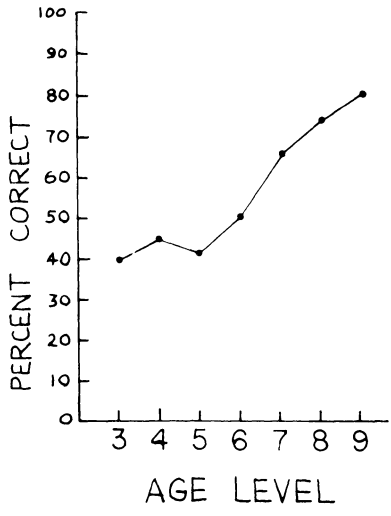
the card and order of figures on each card.

Procedure. Testing was carried out in a small room which was empty except for a table and 2 chairs on opposite sides (*E faced S*). During a warmup period *S* was told that he would be shown some pairs of pictures of animals and would be asked to indicate which figure of the pair looked older than the other, or whether they were the same age.

Following the warm-up, S was told that he would be shown pairs of people, and he was to again indicate whether or not one of the figures looked older (by telling or pointing). Periodically during the testing, *S* was asked why he thought a particular figure was older.

Results and Discussion

Figure 2 shows the accuracy of our *S*s' age judgments for all 28 pairs. The percentages are calculated according to the total number of correct judgments by all *S*s within each age level. As can be seen, accuracy improved fairly steadily from a low of 40 percent at age 3 to 81 percent at age 9. It should be noted that the first *S* to respond completely accurately to all 28 pairs was found at age 7. The 9-year-old age level contained 2 perfect responders and 3 more who missed only 1 or 2 judgments.



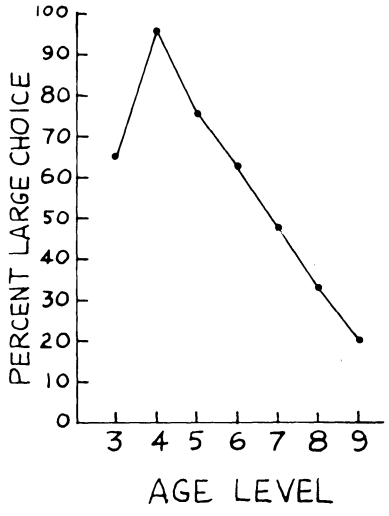


Fig. 2. (Left) Accuracy of judgments for all 28 pairs at each age level.

Fig. 3. (Right) Percentage of responses for the larger figure in pairs containing different figures at 2 sizes, the larger of which represented the younger figure.

Figure 3 refers to the 6 pairs which contained 2 figures differing in size and in which the larger figure was incorrect (i.e., it represented a younger figure). For example, this included the small Adolescent paired with the large Infant. The graph illustrates the percentages of responses for the larger, incorrect, figure. It can be noted that the 4-year-olds responded almost completely to the size dimension in these pairs. These faulty judgments declined sharply with age.

Figure 4 pertains to the 12 pairs in which the figures all appeared at the same size. Thus, these figures included a small Adolescent paired with a small Adult, a large Infant with a large Child, and so on. For these pairs, for which age judgments of necessity had to be based upon information other than the illustrated size, accuracy improved steadily with age.

Figure 5 refers to the 4 pairs which included the same figure at 2 different sizes. An example would be the large Adult paired with the small Adult. The scoring here was keyed according to the *S*s having judged the larger of the 2 figures to be the older; of course, the correct response was a recognition that they were the same figures and thus the same age. As can be seen, judgments at age levels 3 through 7 were largely incorrect, with sharp improvement occurring at ages 8 and 9.

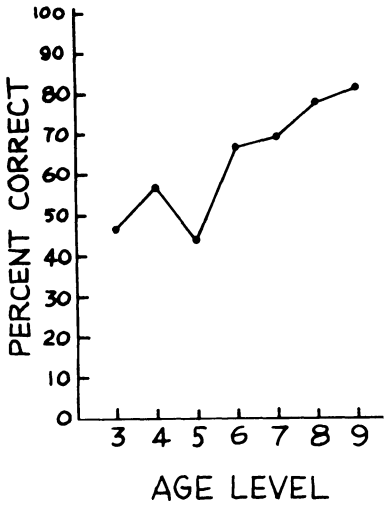


Fig. 4. (Left) Percentage of correct responses for pairs containing figures of identical size.

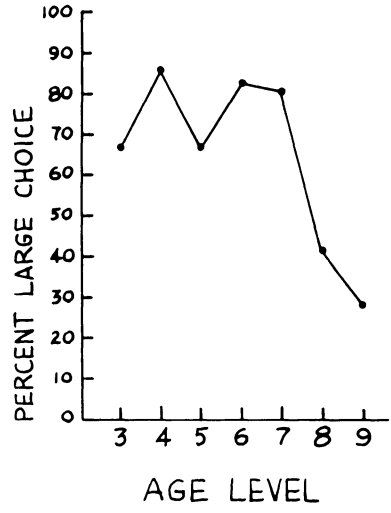


Fig. 5. (Right) Percentage of responses for the larger figure in those pairs containing the same figure presented at 2 sizes.

Although care was taken not to force *S*s to select one of the 2 figures in each pair as being older, it is of interest that *S*s in the lower ages unanimously perceived one of the two figures as older in all cases. At age 5, two Ss gave a few "same" responses, but these were all incorrect. Not until age 7 did there appear correct responses for identical pairs, and even these were made by only 3 *S*s. At age 9 all but 2 *S*s recognized that each of the pairs contained the same figures.

The spontaneous verbalizations, as well as the elicited explanations, gave clues regarding the children's logic in making their judgments. Common explanations given by *S*s age 3 through 6 included these: "He's taller"; "He has to be big to be older"; "He's bigger". When asked for an explanation as to why they had just chosen one figure to be older than the other, some 3- and 4-year-old *S*s merely replied, "I don't know." The responses of these particular *S*s seemed to indicate just that—they didn't know. Their age judgments often seemed haphazard and unsystematic; they seemed to be responding to neither size nor to any discernable physical features. Of particular interest was the response of one boy (age 6:0), when asked why he had picked the Child figure to be older than the Adult figure (both were presented at the same size). The boy reexamined the pair a bit perplexedly for a short time, and then he exclaimed, " 'Cause he's bigger . . . Look!" And then he proceeded to move his finger from the top of the Adult's head over to the top

of the Child's head, making an exaggerated slanting line in doing so.

In Piaget's (1950) theoretical frame work for intellectual development, children aged 2 through 7 years are considered to be "preoperational". The preoperational child, according to Piaget, tends to be dominated by his perceptions; he focuses his attention on a single attribute of a display, and his reasoning follows a transductive, or part-to-part, form of logic. This framework seems useful in describing the responses produced by our young *S*s. Indeed, they seemed to perseverate on one attribute, that of size. These children appeared to be so overwhelmed by this perceptual attribute of the figures that all other visual cues were rendered insignificant. The 8- and 9-year-olds, now entering a period in which more operational forms of thought begin to be used, according to Piaget's theory, seemed to recognize that an object can change in one respect without changing in other respects. These children seemed to understand that a number of physical attributes enter into this concept of age, and therefore they began to take notice of such characteristics as hair, chest size, body proportions, and so on. Thus it appears that at about age 8 or 9 years the child enters a transitional period in which, among other changes, the age-size correlation begins to be disentangled.

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