CHILDREN'S MISUNDERSTANDING OF AN INVERSE RELATION

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One difficulty that young children encounter in understanding division problems is in understanding the inverse relation between the divisor and the quotient. Recent studies (e.g., Correa, Nunes & Bryant, 1998; Sophian, Garyantes, & Chang, 1997) have shown that children find it difficult to judge that when a given quantity is shared out, the larger the number of recipients (divisor), the smaller each portion (quotient). The current studies investigated whether children's understanding of this relation might partly be dependent on the numbers presented in the problems.

Children were presented with problems about two parties of rabbits (with the same total amount of food, i.e., the same dividend). Children had to judge whether a rabbit in one party would get the same (or more) food to eat as a rabbit in the other party. In some trials the number of rabbits (divisors) in each party was the *same* (e.g., 8) and in the others there was either a *small* (e.g., 6 vs. 4) or a *large* (e.g., 12 vs. 2) difference in size between the divisors. Previous research had not investigated whether a large size contrast between the divisors would aid children's understanding of the inverse relation. It was found that children were successful in the same-divisor trials, but only 25% of five-year-olds performed significantly better than chance in the different divisor trials. A common mistake that children made was to say that in the party with more recipients, each rabbit would receive more to eat. There was no significant difference between the small and the large contrast conditions in either five- or six-year-olds. In a second study, children were again given problems involving small or large divisor contrasts but this time they were shown pictures of the resulting portions in each party and children had to decide which sized portion corresponded to each party. It was found that almost 80% of six-year-olds consistently matched the *larger* portion to the party with a *greater* number of recipients, i.e., they inferred a direct rather than an inverse relation.

These studies provide evidence that some young children actually have a *misunderstanding* of the inverse relation between the divisor and that this is independent of the size of the numbers in the problems. Suggestions for future adaptations of the tasks and possible educational implications of the results will be discussed.

Correa, J., Nunes, T. & Bryant, P. (1998). Young children's understanding of division: The relationship between division terms in a noncomputational task. *Journal of Educational Psychology, 90,* 321-329.

Sophian, C., Garyantes, D. & Chang, C. (1997). When three is less than two: Early developments in children's understanding of fractional quantities. *Developmental Psychology, 33,* 731-744.