Social interaction and cognitive development: Further evidence

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The hypothesis of 'cognitive conflict experienced and resolved socially' (Doise, Mugny and Perret-Clermont, 1975) is again the main hypothesis of the present experiment in which we try to show more specifically, how conflicts of cognitive centrations, embedded in a social situation, are a powerful factor of cognitive development. In addition, support for the present hypothesis would also mean that 'social learning' should not necessarily be reduced to 'modelling effect' (Bandura and Walters, 1963; Rosenthal and Zimmerman, 1972).

One task of the standard test for the conservation of length (Piaget, Inhelder and Szeminska, 1960) has been used in this experiment. A child who does not attain conservation of length admits that two equal rulers, whose ends perceptually coincide, are of equal length, but when one of the rulers is displaced so that one of its tips is no more in line with the tip of the other ruler, the nonconserving child thinks that one ruler is now longer than the other one.

Three experimental conditions were constructed around this central task which was administered individually to children (average age: 6:3) who were all non-conservers:

Control Condition (N:13). Each time, starting with the two rulers in line, four different configurations are obtained by displacing alternatively each ruler in the two opposite directions. After each of these four displacements, the subject is asked whether the rulers are of the same length or not.

Condition of incorrect model (N:20). Starting with the two rulers in line and after recognition of their equal length, one ruler is displaced. When S now claims that the displaced ruler is longer than the other one the assistant experimenter points to the opposite end of the other ruler and says: 'I think this ruler is longer, you see, it goes further there'. This judgment is of course as incorrect as the subject's one, but it is based on a symmetrical centration. If the S complies with the assistant experimenter, the experimenter reminds him of his previous answer.

Condition of correct model (N:19). This condition is the same as the previous condition, but the adult assistant experimenter now performs a correct judgment: 'I think both rulers are equal in length, you see, this one goes further here and that one goes further there, so both are the same length'. In Piagetian terms the argument given by the assistant experimenter is that of compensation.

According to our hypothesis, predictions were that progress in both experimental conditions would be significantly better than in the control condition.

Progress has been measured in the following way:

Pretest. Immediately before the experimental phase, Ss were tested for conservation of length on material different from the one used in the experimental task. In addition, they were tested for the conservation of inequality in length on a task identical to the one described in Inhelder, Sinclair and Bovet (1974, pp. 287-289). In this task two wires of different length were presented to the subject who easily recognized their different lengths. Thereafter the longest wire was bent in such a way as to have its ends coincide with the ones of the shortest wire and then in such a way that the longest wire stops short of the extremity of the other. Each time the child was asked whether the wires were of the same length or not. Only children who were at the nonconservation level in both tasks were subjected to the experiment.

Posttests. Immediately after the experimental phase Ss were again tested on both tasks, but in a reversed order. After ten days, in a double-blind condition all subjects were tested again on both tasks. Ss progress when they attain conservation on all items but also when they give responses at the Piagetian intermediary levels, by responding correctly to some 'difficult' items but not to all of them, or when they were not convinced and could not marshall correct arguments for their answers.

Results, as shown in Table 1, confirmed the hypothesis. However, in both experimental conditions advances were not of the same importance for the two tests; this could mean that cognitive restructuration is characterized by different dynamics in the presence of a correct model and in the presence of an incorrect contradictor.

The extent to which the peculiar status of an adult assistant experimenter could be held responsible for the observed effect remains an open question. This could be checked by using a confederate of the same age as the subjects. In other experiments (Mugny, Doise, to be published; Perret-Clermont, doctoral dissertation), where children had to perform a task with an associate, it was observed that interaction with children of a 'lower cognitive level' results in a significant

Table 1. *Frequencies of progress at posttests (P) 1 and 2*

Conservation test			Experimental conditions			
	Control		Incorrect model		Correct model	
	P 1	P 2	P 1	P 2	P 1	P 2
Equal lengths	0	1	9**	9*	18**	17**
Inequal lengths	1	3	13**	15**	9*	11

Significance levels of the difference to the Control condition (Fischer tests):* $p <.05$, ** $p <.01$.

progression for relatively more advanced children. As well as the results of the present experiment, especially those from the incorrect model condition, the data from that previous study clearly show that the role of social interaction in cognitive development could not be explained through modelling effects only. Our data suggest a reintegration of the modelling effect in the framework of our sociocognitive conflict approach. Indeed such a conflict arises also when a subject's own conception is confronted with that of a model.

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