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Conflict and Cooperation as Opportunities for Learning

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Is learning an individual process?

Is learning an individual process? When we visit schools at home or abroad whether they be 'traditional', 'informal', or 'child-centred' and in spite of the evident variety in the procedures used for teaching and learning, the learning process itself is almost universally viewed as a matter pertaining to the capacities and motivation of the individual child.

In some schools, teaching seems to be conceived as a matter of properly transmitting a certain body of knowledge, whose character is defined as relevant by the teacher, the school, other educational authorities or the 'culture' at large. This knowledge is directed at pupils by means of lectures or written texts, often to a whole class of children, sometimes to groups of children, and more rarely to individuals. Multiple copies of roneoed materials are likely to be identical for all pupils; textbooks themselves are prepared for thousands of children.

Although this information is transmitted to a group, paradoxically the individual pupils are not actually perceived by teachers as members of a group.

Many features of the environment can contribute to the isolation of the pupil during his learning. Even when desks and chairs are transformed from rows to groupings around tables, the pupil may be expected to be quiet as he works through a programme. The programme remains the same for all children; it is simply pursued individually. Essentially the pupil works by himself, and teachers assess his work on an individual basis also. The question is 'What can he manage on his own?'

But is it either necessary or desirable for effective learning that the child works essentially alone? While it may be true that there are

occasions when a pupil needs to be alone to puzzle out something for himself or to concentrate undisturbed, we would like to question the common view that all learning is an activity requiring isolated concentration.

In this important respect many of the teaching methods sponsored by advocates of child-centred education are not importantly different from the methods of 'chalk and talk'. The child-centred conception and intention is to foster the learning processes *stemming from within the child*. He is again perceived as an individual with his own capacities, desires and questions, which are viewed as symptoms of his individual growth and activity. The school tries to provide for the development of these, often by devising *individualised* teaching treatments, which in turn contribute to a perception of the child as an individual, albeit a unique one.

Often the teachers, especially those who claim to practice child-centred education do indeed also work with small groups of children and place themselves at their disposal to help them to learn in a more personal manner. Notwithstanding this, the reasons teachers give to justify such attitudes are usually humanistic rather than pedagogic: 'Children need attention', 'It is good for them to learn to be sociable with friends' or 'It is more fun for them'. Only rarely are the reasons given linked to the cognitive processes involved in learning, e.g. 'A child must discuss his thoughts to fully understand them', 'He needs to try out his ideas on somebody else'.

Teachers are not the only people responsible for such a view of children and their learning. As Perret (1978a) argues, the theoretical models of intelligence that psychologists have constructed often contribute to a similar conception and serve to reinforce and justify such practices. The psychological assumptions of many assessment procedures make aptitudes and competencies properties or traits of the individual whose characteristics are then believed to determine whether or not he will be likely to benefit from a given educational treatment.

Developmental approaches in the field of the psychology of intelligence often call attention to the sequence of changes that occur in the characteristics of the child's cognitive capacities. Even if these may point successfully to the different educational needs of children at different development stages, they still consider the child as an isolated individual; and the stages themselves are seen as characteristics of individual growth.

Yet at the same time these approaches have maintained that the child grows up *within* an environment that can have differing impacts

on the course his development will take; some environments are more likely than others to provide for the child's needs and thereby facilitate his growth and enable him to realise his proper potential. On this view of a child growing up 'isolated in his social environment' the educator's role is confined to protection and feeding of the intellect and emotions. He is like a gardener who supervises the needs of a plant for light, heat, water and fertiliser, but does not have an active role to play in the growing process of the plant, except through such interventions as pruning. But is this botanical analogy really useful for understanding the cognitive and social development of children? 'Pruning' can serve to remind us of educational treatments that interfere with the child's activity in order to shape into the expectations and plans of the adult. Metaphors of watering and feeding encourage an attitude of respect for the child's activity, but may lead us to neglect the extent to which the explicit or implicit *demands* of the environment play an active role in influencing the course of development. The developmental processes of human beings are likely to be more complex, subtle, and supple than those of plants. Too simplistic developmental analogies are misleading and fail to do justice to the wealth of sub-cultural and cross-cultural variation in children and adults. Cross-cultural studies point to variations from social group to social group both in the forms of stages of cognitive growth and the rates of progress through these. In so far as these differences are real and not simply artefacts of the research methodologies and conceptual frameworks used, the reasons for their existence will not be explained by referring to the traits of individual children.

Such explanations cannot provide the teacher or educational research worker with conceptual frameworks that enable them to understand how the educator's behaviour *does interact* with the pupil's learning. A more specific and deeper appreciation of the way these interchanges are relevant to learning and development could, we believe, help us to specify the social and cognitive characteristics of educational settings promotive both of the learning of specific skills and of the development of more general cognitive competencies. When psychological research can offer conceptual frameworks that accurately predict the interchanges between an individual and his social and cultural environment and their impact on cognitive growth, we believe it also offers the means to specify educative actions and assess the pupils' reactions to these.

Before we turn to examine this work, it is useful to consider briefly some of the consequences of sociological explanations of the differential achievement of children of different social groups in terms

of the impact these have on educationalists' attitudes and practice. Although these approaches often make specific recommendations – or more often *post hoc* interpretations – about the environmental conditions judged to be appropriate for normal cognitive development of such children, they do not explain why and how the particular sociological character of such factors as housing conditions, parental occupations, declared child-rearing practices, social aspirations, access to cultural media and language standards, etc. interfere with or facilitate the child's learning. Are these mechanisms assumed to be obvious or trivial? We do not think they are either. Such psychological mechanisms as have been postulated have not been tested other than through simple correlational studies. Even in Bernstein's (1971, 1975) approach in which the functional role of language for the individual within a social setting and in a socio-cultural group is emphasised, the claims about differences in role relations and interpersonal relationships are not linked to psychologically based theories of learning.

It is only by going beyond this level of analysis that the social scientist can discover the psychological processes *mediating* any differential development of cognitive competencies. If the type of interpersonal relations which pupils have with adults does have an impact on the learning he achieves, it is important to identify which kinds of relationships are linked to which cognitive outcomes. We have examined these questions elsewhere (Schubauer-Leoni and Perret-Clermont, 1980) in terms of different cognitive outcomes. Here we focus upon varying the interpersonal relations to examine their impact on cognitive development.

The interchange between the child and the social setting: Communication, understanding and performance

In his current research Perret (1978a) demonstrates that the understanding which a young child has of a task will influence not only the level of performance he achieves, but also – and in the long term this may be more important – his communicative behaviour with his social environment. For example, it is only if the child already has some knowledge and ideas about the solution of a technical problem that he can or will ask questions of an adult or some other source of information for those matters that are arbitrary or conventional and not logical. Without a minimal level of understanding he will not be able to decide whether it is logical (and then he should find it out for himself) or arbitrary/conventional (in which case he must ask).

When at an earlier level of understanding the child is as yet incapable either of starting to solve the task or seeing that his suggested solution is wrong, he is also incapable of identifying the *kind* of help he needs – the type of relevant questions he could ask; hence he has great difficulty involving himself in an adequate interchange with his social environment about the task.

Observing older pupils of an Upper school involved in group work, Perret (1978b) has seen their cognitive activity deteriorating when they have failed to realise that they have not understood their teacher's instructions. Perhaps because they have not wished to constrain the approach of the students to the project proposed, the teachers have failed to be sufficiently explicit in their communication, and this defective communication has impeded the work of the adolescents concerned. These processes have two consequences when the pupil does not understand the nature of the task set, he is unlikely to be able to formulate constructive questions about his non-understanding. He does not know what to ask of the teacher. Under these circumstances he is unlikely to perform well.

The second consequence is made explicit in the work of Labov (1972) and Katz (1973) which reveals how the quality of the pupil's performance is sensitive to the social relationship obtaining on the occasion of its elicitation; the performance is richer when the pupil is at ease in his relations with the experimenter.

We suggest that ease of communication with the experimenter frees the subject to concentrate his efforts upon the task itself and saves him from the additional task of understanding and mastering the social relationship in which he is simultaneously involved. Given that adult and child are able to focus on the cognitive task set what is the possible relevance of the language used to the quality of the child's performance?

In an empirical study of relationships between children's mastery of Piagetian cognitive operations and their own semantic competence, Rommetweit (1976) offers striking examples of the importance of establishing common intersubjectivity between child and adult via linguistic prestructuring of the task. When presented with the drawings of circles shown in Fig. 1, some 7-year-old Norwegian children promptly pointed to the target object when it was called 'the second biggest snowball' but not when it was referred to as 'the second biggest white circle'.

Rommetweit shows how in tasks involving class inclusion, ordering and bi-variate classification children are sensitive to the interplay between what they see and what they hear. The operative capacities

FIG. 1 Referential domain for choice of 'The one of the WHITE CIRCLES/ SNOWBALLS that is SECOND BIGGEST'

they reveal will depend on their semantic competence to understand what is made explicit in the instructions and their appreciation of what the adult has left implicit.

Rommetweit's concept of the 'architecture of intersubjectivity' is also useful as a framework for understanding the conditions that enable a teacher and a learner to achieve common intersubjectivity and hence to communicate effectively with each other. It is similar in thrust to Schaffer's (1979) observations of mother-infant interactions in the first months of life. He shows attention to important social prerequisites of cognitive development: the regularity of the rhythmic biological patterns in which the infant is involved (e.g. feeding) offers a basis for the mother to anticipate his behaviour and enter into a 'pseudo-dialogue'. This will gradually become more complex and flexible with greater intentional initiative being taken by the child. But it is clear that this important social and cognitive development is likely to come about *only if* the child's partners are willing and able to sustain his behaviour by responding *contingently* and appropriately in these exchanges. Contingency of the adult's responses linked to the direction of the baby's action is a necessary condition for achieving common inter-subjectivity between adult and child. It is within these pseudo-dialogues that the words and other features of behaviour to be learned are introduced and learned.

It appears that the types of inter-personal relationships that the child must establish influence both the level of his immediate task performance and the availability or not of opportunities for *learning*. Learning cannot occur independently of the social context which induces it; it cannot be reduced to matters of simple transmission of adequate information. Information transmitted will be more likely to be learned if the learner is a partner in an interactive communication process. Confining him to the role of a listener-receiver will be insufficient. It seems that information, perhaps even thinking itself, takes its relevance for the growing mind of the learner within his own contingent schemes of actions and his own cognitive grasping of tasks he faces.

It is also clear that any given task does not have the same social meaning for all children. Haroche and Pêcheux (1972) contrasted the problem-solving behaviour of factory workers and students. Reversals of differential superiority were shown to be related to the form in which the problems were set. Doise, Meyer and Perret-Clermont (1976) showed similar relationships between semantic content and cognitive performance in adolescents of different school streams.

It is also clear that any inter-personal relationship context does not have the same meaning for all children. The social distances between children and the experimenter (teacher) are not always the same. The adult is most often the person responsible for establishing and regulating the communication. Hence the children who lack the necessary information (often children of disadvantaged social groups) are also those who feel the greatest social distance with the adult (Perret, 1978a). It is not surprising then if they are also the children who least frequently pose questions. Differential levels of performance by children may reflect this differential distance between the child and the teacher. The experiment to be reported illustrates these problems.

Study 1: Social context and performance: *the responses of 6-year-olds in Piaget's classic test of the conservation of liquids*

It is a general finding that performance on intelligence tests correlates with privilege of socio-cultural origin. Interpretations of these correlations vary, often assigning primary causation to one of three main sets of factors: social, psychological or biological. In view of the significance attached to performance on such tests as predictors of educational performance, it is important to elucidate the psychosocial processes that create these correlations.

Piaget claims that his theoretical framework is describing universal features of the development of intelligence. If this were so, the same cognitive performance should be manifested by a given child whenever and wherever it is studied – as typical of his stage of cognitive growth. Empirical studies refute this. The Piagetian school suggests that some environments are more likely to facilitate development than others, but does not say *how* or *why*. To assert that the sequence of emerging structures is universal, but that some social contexts reduce the rate of progress might be trivial if it were not for the pos-

sibly suspicious fact that the children who emerge as most advanced were very often (Dasen, 1977) precisely those from the same subculture as the authors of the reasearch; *viz.* Western middle-class. (Anyone who has tried to explain these results to students from Third World countries may have felt the risk of ethno-centrism that such an assertion carries.) It is possible that this kind of research is an example of social pre-constructs acting ethno-centrically as deforming prisms. Can such pre-constructs be dismantled at all by studying precisely how and why social factors affect cognitive development? We hope to illustrate how this might be achieved.

METHOD

The children investigated here were drawn from the First Grade classes of primary schools in seven villages near Locarno, Switzerland. We tested the thesis that children of different social backgrounds would be differentially sensitive to the characteristics of the social setting in which the cognitive level of their performance is assessed.

The hypothesis was tested in two ways. In the first the social conditions for presenting the traditional questions were varied. In the second the children were exposed to different kinds of social interaction previously found to be associated with progress in conservation of liquids (Doise, Mugny and Perret-Clermont, 1975; Perret-Clermont, 1980; Mugny, Perret-Clermont and Doise (1981).

To achieve these aims the experiment was organised into three stages: a pre-test, exposure to different conditions of learning, and a post-test, essentially similar to the pre-test.

Subjects

It was not possible to draw a random or representative sample of children in the villages. In the state schools for which permission to conduct the investigation was granted, all first year children who were present were included in the sampling. The ages ranged from 5;9 to 6;9. School registers were used to extract declared parental occupation, and although coarse, the information was sufficient to stratify the children into four groups in terms of the criteria presented in the Geneva Statistical Yearbook of Education:

Group 1: unskilled and semi-skilled workers

Group 2: qualified employees, small farmers, small shopkeepers, routine white collar workers

Group 3: schoolteachers, technicians, middle managers, etc.

Group 4: liberal professions, senior managers, directors, etc.

This categorisation had previously been shown to be associated with performance on Piaget and Szeminska's (1941) classic conservation of liquids task (Perret-Clermont, 1980).

Following this categorisation, children from Group 2 were omitted, Group 3 and 4 were combined as the 'privileged group' and Group 1 were labelled the 'underprivileged group'. The final sample comprised 82 boys and 77 girls: the privileged group consisting of 51 children (32 boys and 19 girls), the underprivileged group 108 children (45 boys and 63 girls). There were no known reasons for the apparent over-representation of boys in the privileged group.

Materials

The materials were those used in earlier experiments (Perret-Clermont, 1980): two identical 260 ml beakers A and A^1, a beaker C shorter and wider than A and A^1, an opaque bottle containing fruit juice, and drinking straws. For the second part of the pre-test a new set of beakers (E and E^1) was used, along with a beaker F of the same height, but wider. Two identical female dolls were used in one condition.

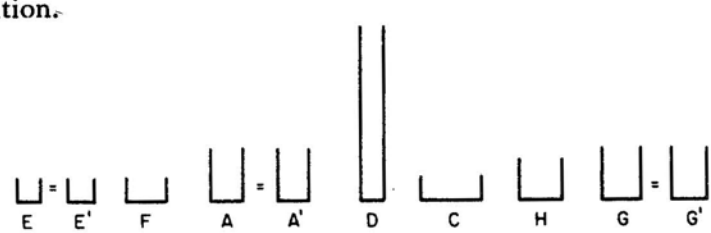

FIG. 2 Beakers used in experiments

Experimental conditions and procedure

Each child was tested individually in a separate room at the school by the experimenter (*E*) (female). Another adult (male) made notes about the conversation and significant events. After a relaxing conversation, the child (*S*) was shown the materials and invited to play 'a game with some juice' which he would be able to drink later if he so wished (see Perret-Clermont, 1980, pp. 44–45 for details). *E* asked each *S* a set sequence of identical questions about the relative quantities of fruit juice in A, A^1 and C (referred to as 'glasses' (bicchieri) in the instructions).

Pre-test: Phase 1 *E* asked *S* to pour equal quantities of juice into each of the two beakers, A and A^1. 'You must put juice in the 2 glasses so that they will both have just as much juice to drink. And now, have they both the same to drink or not?' When *S* was satisfied

that the amounts were equal, *E* poured the liquid from beaker A into beaker C, and *S* was asked, 'Is there the same amount of juice in these two glasses or has one more or less or what do you think? *S* was then asked, 'Now I am going to pour (ancora una volta) the juice in glass C into this glass A. How far up this glass will the juice go?' *S* then poured the juice back into beaker A and was asked, 'And now is there the same amount of juice to drink in the two glasses or is there less in one or is there more in one or what do you think?' The third sub-phase repeated this procedure with A^1 instead of A, except that *E* made a counter-suggestion after the judgement following the first pouring. Conservers were told, 'Another child told me that there is more juice to drink in this glass (*E* points to A) because the juice goes higher up into it!' Whereas nonconservers were told, 'Another child told me that one glass is wider and the juice stays lower and one glass is thinner and the juice goes higher up into it but in both glasses there is just as much to drink. Is he right?' The rest of the sequence consisted of repeating the three sub-phases (but omitting the counter suggestion).

Two conditions were used. In the first *E* and *S* had the beakers A and A^1. In the second the identical dolls each had a beaker A or A^1 and had to be given equal amounts of juice. This was for the three first sub-phases. Then the contexts were reversed. Those children who started sharing the juice between the experimenter and themselves continued by sharing it for the dolls – and vice versa. Just over half the children (51 underprivileged and 30 privileged) received the Experimenter-Child condition first; 57 under-privileged and 21 privileged children had the dolls first.

Subjects were also equally divided in the Experimenter-Child condition as to whether *E* or *S* had Beaker C: 41 *S*s had beaker A while *E* poured from A^1 to C (AF condition). The other 40 poured from their own A^1 into C (CE condition).

For the sub-sample that started with dolls, the division into AF and CE applied to the first three questions after the counter-suggestion. Finally, 51 *S*s from the underprivileged group kept their A, 57 used C; in the privileged group 27 kept A and 24 C.

Pre-test: Phase 2: No dolls were used, and essentially the same procedure was followed except that beakers E, E^1 and F were substituted for A, A^1 and C. Subjects in AF in Phase 1 had a wider beaker F; those in CE had the thinner beaker E. No countersuggestions were made. Children were told that beaker E^1 was for them to use if they wanted to do so. At the end the child was asked from which beaker (E or F) he wanted to drink.

Hypotheses

1 *Privilege* The privileged group should perform better on the conservation tasks overall, in line with previous findings (Coll-Salvador, Coll-Ventura and Miras-Mestros, 1974; Perret-Clermont, 1980).

2 *Social conditions of the task* Children should perform better when directly involved in the task; the Experimenter-Child condition should give superior results to the Dolls condition (Doise *et al.*, 1976; Doise, Dionnet and Mugny, 1978; Lévy, 1980).

In addition when the fruit juice is shared between the experimenter and the child himself, and the child sees *E*'s juice transferred to a wider and shorter beaker C, his perception of the level reached may lead him to think his beaker has retained more; a conserving judgment requires him to 'rationalise' an apparently social inequality of distribution which is acting in his favour despite his inferior social status *vis-à-vis E*. Hence *S*s in the AF condition should be led to perform better to maintain a possible unusual privilege. This hypothesis was suggested by J. B. Rijsman on the basis of a pilot study which he conducted in Tilburg.

3 *Effect of social origin on the interpretation of the social conditions of the task* While there is social distance between *S* and *E* for both privileged and underprivileged children, this is greater for the underprivileged. Hence differences due to both components of Hypothesis 2 should be greater for them.

Treatment for results

Criteria for conservation *S*'s performance was evaluated on a 7-point scale ranging from no sign of conserving behaviour to full spontaneous mastery. This scale is finer than the one normally used; it takes account of discrepancies occurring on different judgements in the same test.

Non-conservers

NNC: Those *S*s who give no conserving judgments and cannot even predict what the level of juice in A^1 will be, when it is returned from C to itself.

NC: *S*s who predict constant equality of levels in A and A^1, but who judge amount has changed when the juice is poured into beakers of different dimensions. They pour equal *levels* of juice into E and F.

Intermediate

I_1: These *S*s behave like non-conservers in response to the first three questions but give a conserving judgment after the counter-

suggestion. In the second part they pour unequal levels into E and F (visual compensation with no measurement).

I_2: These *Ss* oscillate between conserving and non-conserving judgments throughout the test corresponding to none of the patterns described previously. They are not conservers.

Conservers

C_0: While giving conserving judgments and supporting reasons during the first part of the pre-test, these *Ss* display non-conserving behaviour in the second part (i.e. they pour equal levels into E and F).

C_1: These *Ss* give conserving judgments in the first part and make visual compensation when pouring into E and F.

C_2: As C_1 but these *Ss* use beaker E^1 in the second part as a means of measuring the correct quantity for beaker F.

The Rank Sum Test with extensive ties was used to test trends where only two groups were contrasted; when three or more groups were used Jonckheere's general version of the test was used (Leach, 1979).

RESULTS

Hypothesis 1 The privileged children displayed a significantly higher level of mastery of conservation than the underprivileged children (The Rank Sum Test with extensive ties, $z = 3.97, p = 0.0001$).

TABLE 1
Cognitive level on conservation of liquid (pre-test) as a function of social origin

Social origin	Cognitive level							
	NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
Underprivileged	3	74	1	3	9	16	2	108
Privileged	1	16	3	1	13	14	3	51
N	4	90	4	4	22	30	5	159

Hypothesis 2 The Experimenter-Child condition gave higher performance than the dolls' condition ($z = 2.27, p = 0.01$) (see Table 2). These contextual differences yielded this difference, although they were effected only for the first part of the procedure.

Contrary to prediction, whether the child kept beaker A (AF) or changed it for the wider, shorter beaker C (CE) did not seem to make any difference ($z = 0.35, p = 0.36$) (see Table 3). This will be examined further later.

TABLE 2
Cognitive level on conservation of liquid (pre-test) as a function of social conditions of task

Participants	Cognitive level							
	NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
Experimenter-Child	0	40	4	2	15	16	4	81
Dolls	4	50	0	2	7	14	1	78
N	4	90	4	4	22	30	5	159

TABLE 3
Cognitive level on conservation of liquid (pre-test) as a function of Who has Which Beaker

Beaker possession	Cognitive level							
	NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
S has A and keeps it	2	43	1	3	10	17	2	78
S has A and changes it for C	2	47	3	1	12	13	3	81
N	4	90	4	4	22	30	5	159

TABLE 4
Cognitive level on conservation of liquid (pre-test) as a function of social origin and social conditions of task

Social origin	Cognitive level							
	NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
Underprivileged								
Experimenter-Child	0	32	1	2	5	9	2	51
Dolls	3	42	0	1	4	7	0	57
N	3	74	1	3	9	16	2	108
Privileged								
Experimenter-Child	0	8	3	0	10	7	2	30
Dolls	1	8	0	1	3	7	1	21
N	1	16	3	1	13	14	3	51

Hypothesis 3 In Table 4 it appears that privileged children were unaffected by the manipulation of social context ($z = 0.37, p = 0.35$) and that the effect was due entirely to the behaviour of the underprivileged children ($z = 1.90, p = 0.028$). Keeping beaker A or exchanging it for beaker C again appeared to have no consequences for either privileged or underprivileged children (see Table 4).

EVALUATION OF RESULTS

When we derived Hypothesis 2 about the effects of social conditions upon performance, we reasoned in terms of the *whole* population of subjects; we were assuming general psychological principles. This is a traditional approach even when between-subjects variance is expected. In some respects the evidence appeared to support the validity of this assumption (Experiment-Child versus Dolls effect), but once this 'general' effect was analysed for sub-groups, its generality disappeared; it was seen to hold only for children in the underprivileged group. While this might be viewed as stemming from 'faulty' sampling and the application of statistical techniques to the whole sample before testing for differences within sub-groups, we may note that the empirical precedent from which the prediction was derived led us to expect a general rather than a specific to one group effect. [This is a frightening aspect of too much research in psychology and education. Theoretical models are erected which are literally global and universal. While these sometimes allow for there being *inter-individual* differences (often relegated to an 'error term' in the statistical analysis), these models seldom allow for *inter-group* differences. The subjects are usually chosen at random from the population regardless of their sociological characteristics.]

This is not simply an issue of the adequacy of the sampling. What should be the principles of sampling? What should be considered a proper population when planning research? Which wider social group memberships should be treated as possible relevant sources of variance? Whatever answers are given and whatever results are obtained, how can the interpretation be erected to the status of a 'general law', when it has been tested only on a specified population? And to understand that it is a specific population one should turn to sociology for help in defining the population and the proper criteria for sampling it.

And when typologies are drawn up, there remains the difficult task of interpreting the nature of the reality of the underlying categorisation erected: is it social or biological – or has it been induced by the methodology used? This last is as important a matter in psychology as in physics.

In respect of the particular study reported we have to disentangle the relevance of sex and social origin. Were the sex groups 'socially equivalent' or not?

Secondary analysis by sex, social origin and social conditions

These considerations led us to look back at the results and make a post hoc analysis. Was there another social categorisation, i.e. another sampling criterion, against which the subjects distributed non-randomly. For example, were there sex differences?

Taking the whole sample there was no statistical difference between the performances of the boys and girls, although there was a trend in favour of the latter ($z = 1.38, p = 0.08$) (see Table 5). This unexpected trend could have been due to there being proportionately more boys

TABLE 5
Cognitive level on conservation of liquid (pre-test) as a function of sex and social origin

Sex	Social origin	Cognitive level							
		NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
Boys	Privileged	0	13	2	1	6	8	2	32
	Underprivileged	2	27	0	1	2	11	2	45
	N	2	40	2	2	8	19	4	77
Girls	Privileged	1	3	1	0	7	6	1	19
	Underprivileged	1	47	1	2	7	5	0	63
	N	2	50	2	2	14	11	1	82
	N	4	90	4	4	22	30	5	159

than girls in the privileged group however. From an analysis controlling for social origins nothing emerged that helped to clarify the matter (priviledged group, $z = 0.88, p = 0.18$; underprivileged group, $z = 1.26, p = 0.10$ – in favour of boys). However within sex groups social origin discriminated between the girls ($z = 4.03, p = 0.00003$) much more strongly than it did between the boys ($z = 1.47, p = 0.07$). Should there have been a bias in the parental declaration of their occupations for the boys, that would have weakened any social origin effect in the results and that would also explain the over-representation of boys in our sample. If such was the case then it still remains plausible that boys tended to perform better than the girls overall.

Did social conditions operate equally for boys and girls? As Table 6 shows, they did not. There was no strong difference between

TABLE 6
Conservation as a function of experimental conditions, social conditions, sex and social origin

Sex	Social origin[a]	Condition	Conservation level						
			NNC	NC	I_1	I_2	C_0	C_1	C_2	N
Boys	P	Experimenter/Child	0	7	2	0	4	4	2	19
	U		0	11	0	0	0	4	2	17
	P	Dolls	0	6	0	1	2	4	0	13
	U		2	16	0	1	2	7	0	28
Girls	P	Experimenter/Child	0	1	1	0	6	3	0	11
	U		0	21	1	2	5	5	0	34
	P	Dolls	1	2	0	0	1	3	1	8
	U		1	26	0	0	2	0	0	29
Boys	P	Beaker A kept (AF)	0	8	0	1	5	5	0	19
	U		0	10	0	0	1	5	2	18
	P	Changes for C (CE)	0	5	2	0	1	3	2	13
	U		2	17	0	1	1	6	0	27
Girls	P	Beaker A kept (AF)	1	1	1	0	2	3	0	8
	U		1	24	0	2	2	4	0	33
	P	Changes for C (CE)	0	2	0	0	5	3	1	11
	U		0	23	1	0	5	1	0	30

[a] *P*, privileged; U, underprivileged

the experimenter-child and dolls conditions for boys ($z = 0.99, p = 0.16$), but the difference was highly significant for girls ($z = 2.56, p = 0.005$). Does this mean that the girls behaved like the underprivileged group did in the analysis testing the second hypothesis – in spite of or precisely because of the fact that dolls are usually more familiar to them than to boys?

Table 7 presents the results concerning the effect of the type of beaker received by the child. There were no differences for either boys ($z = 0.97, p = 0.16$) or girls ($z = 0.53, p = 0.29$).

From these results concerning the impact of the social context in this sample, sex was as much a relevant dimension of categorisation as social origin for performance. Just how these two are associated must await further exploration because of the sample's characteristics, but we can see the summary of the behaviour quite clearly in Table 8.

None of the four groups showed any effect on performance deriving from the type of beaker used. Boys showed no effect deriv-

TABLE 7
Conservation as a function of social origin and sex

Sex	Social origin[a]	Conservation level							
		NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
Boys	P	0	13	2	1	6	8	2	32
	U	2	27	0	1	2	11	2	45
	N	2	40	2	2	8	19	4	77
Girls	P	1	3	1	0	7	6	1	19
	U	1	47	1	2	7	5	0	63
	N	2	50	2	2	14	11	1	82

[a]P, privileged; U, underprivileged

ing from the Experimenter-Child versus Dolls manipulation; neither did privileged girls. However the effect of the underprivileged girls was strong ($z = 2.74$, $p = 0.003$). The particular manipulation of social conditions of context was therefore very pertinent to estimates of the performance of this particular social group.

TABLE 8
Summary of the effects of variables on conservation

Subject variables	Experimental conditions			
	E/C *vs* Dolls		Beaker	Effect
	z	*p*	*z*	*p*
Boys, privileged	0.34	0.36	0.34	0.36
Girls, privileged	0.00	0.50	0.38	0.35
Boys, underprivileged	0.51	0.30	1.22	0.11
Girls, underprivileged	2.74	0.003	0.08	0.53

Study 2: Social context and learning

In Study 1 we have seen how children from different social categories reacted on the cognitive level to different social conditions of tasks performance. An apparently similar situation was not socially equivalent for all subjects. What applies to task performance may apply equally importantly to learning. Our thesis is that the same mechanisms are at work in both, and the second study observes the consequences for different social groups of providing different social conditions of learning.

There is still a lack of specific research methods and conceptual frameworks (Brun and Conne, 1979) for observing *directly* the dynamics of learning and the organisation of operatory structures. In Study 2 we limited ourselves to the construction of different situations likely to lead to different levels of learning, and we had to make inferences about the dynamics of the learning from the observable outcomes.

In a previous set of experiments reported elsewhere (Doise *et al.*, 1975: Perret-Clermont, 1980; Mugny *et al.*, 1981; Doise and Mugny, 1981), we have shown that when presented with certain kinds of interactions with partners about a cognitive problem, children who were non-conservers at pre-test were likely to display conserving behaviour on the post-test. Subjects were particularly likely to benefit when the interaction involves *socio-cognitive conflict* with one or more partners.

In the case of conservation a non-conserving child who has the necessary operatory prerequisites will be more likely to grasp and structure the idea of conservation, *viz.* learn it, when his partner is a conserver and is therefore proposing and defending a different answer than when his partner is a non-conserver making responses similar to those of the subject himself. In particular, non-conserving subjects interacting with conservers in a task requiring them to share some juice using beakers of unequal dimensions show more progress on post-test than those sharing with a non-conserving peer.

This hypothesis of the role of socio-cognitive conflict in development allows us to offer an alternative explanation for the demonstrated benefits of 'modelling' as a stimulus for conceptual growth (cf. Rosenthal and Zimmerman, 1978). We suggest that the presentation of a model may set into action a social conflict between the child's own initial perception of a problem and the one displayed by the person he is asked to observe. He is asked to overcome this conflict.

We would additionally suggest however that mere presentation of an alternative is less likely to induce socio-cognitive conflict than the direct confrontation of a true interchange with a partner; in such a dialogue the child will be more directly and contingently, involved in justifying (and if he fails, restructuring) his point of view. Confronted by a model alone the child has to abstract the meaning of the message that is there to be conveyed. He may also be puzzled as to why he is being presented with a model! The differences between modelling and direct interchange with a more advanced partner should be reflected both in the number of children likely to be affected by the experiences and by the extent of progress if they do change.

METHOD

Subjects

The sample of children was drawn from the population of Study 1. Children at the intermediate stage of conservation (I_1, I_2) readily learn to progress to the more advanced stage of conservation (Inhelder, Sinclair and Bovet, 1974), and hence only subjects who were non-conversers on the pre-test (NNC and NC) were retained in the sample for the second phase of the investigation. Other reasons such as absence, etc. reduced the sample to 69 subjects.

Among these only 11 were from the privileged social group; they were all assigned to Condition 2 (modelling) (see below). The other 58 from the underprivileged group were assigned as follows: Condition 1, 12 (3 boys, 9 girls); Condition 2, 19 (7 boys, 12 girls); Condition 3, 27 (12 boys, 15 girls).

Materials

Post-test materials were similar to pre-test beakers, but additional ones were included: D, which was taller and thinner than A and A^1; G and G^1 which were as tall as A and A^1 but wider; H which was shorter and wider than G and G^1 (see Fig. 2).

Experimental conditions and procedure

Children were seen twice after the pre-test. They experienced an 'experimental session' about two weeks after the pre-test and an individual post-test, essentially the same as the pre-test, approximately seven days after this.

Experimental session The experimental session provided opportunities for learning in an interpersonal situation. Each *S* experienced interaction with a partner of one of three kinds: (*i*) Sharing juice with a peer who was a conserver on the pre-test; (*ii*) a situation in which conserving behaviour was modelled by a male adult; (*iii*) sharing juice with a peer who was a non-conserver on the pre-test.

Subjects in the peer interaction conditions (1 and 3) were asked to share between themselves some fruit juice presented in an opaque bottle, as described by Perret-Clermont (1980, p. 46); they were given beakers A and D and told they had to share the juice, and when agreement had been reached that they could drink the juice (if they wished to do so). Beaker A^1 was put at their disposal. In Condition 1 the non-conserving *S* was given the beaker A, while his conserving partner had the taller, thinner beaker D. The non-conserving *S* was given the opaque bottle and asked to start the sharing. In Condition

3, inevitably half the experimental *Ss* had A and half D, half of each beginning the sharing.

In Condition 2 the children individually observed the twin dolls. Initially *S* was asked to pour equal shares for the dolls; one having beaker A, the other having beaker D. Beaker A^1 was at his disposal. This procedure was then repeated and modelled by the co-experimenter who behaved as a conserver while *S* was invited to observe how he did it. (Because the child was a non-conserver matching liquids on levels, he was exposed to a result different from his own by the model.) Once the sharing had been completed by the adult, *S* was offered both beakers and invited to choose and drink from one of them. Throughout, the adult's behaviour was matched as closely as possible to the behaviour of the previous conserving child to control for the information made available to the child in both experimental groups.

Post-test The first two parts of the post-test were like the pre-test, except that the countersuggestion was made after the fourth item. Children who had begun the pre-test in the Experimenter-Child condition began the post-test with the Dolls' conditions and vice versa. Similar controls were exercised for the distribution of beakers A and C, and E and F.

In a third part of the post-test *S* was required to pour equal quantities of juice for himself and *E*, one of whom had a beaker D and the other C (C was much shorter and wider than D). Beakers A and A^1 were at their disposal if they wished to use them. Half the children were given D, while the experimenter had C; for the other half this was reversed.

Finally *E* poured equal levels of fruit juice into the unequal beakers G and H (H was wider than G) and left G^1 empty. *E* then asked *S* what he thought about it. *E* additionally asked *S* to predict the level the juice would reach if poured from H to G. Those *Ss* who had had beaker D received H at this point and those who had had C received E.

The post-test ended with a task involving questions about the conservation of matter, using equal balls of plasticine, one of which was transformed by *E* into a pancake and back to a ball after judgements and predictions about quantity had been made. Two other transformations were also made: into a sausage and into 8–10 pieces.

Hypotheses

Hypothesis 1 Given the relatively strong learning effects anticipated, even in Condition 2 we expected similar post-test performances of *Ss*

from the privileged and underprivileged social groups. Given adequate conditions (i.e. 1 and 2, but not 3) all children should learn. The effects under Condition 2 should be greatest for underprivileged girls, who have more to learn and whose final performance should reach the levels of the other groups.

Hypothesis 2 From previous research we would rank-order the three conditions in descending order of strength: 1, 2, 3. Condition 1 minimises social distance between interactants, personally involves S, and makes the cognitive conflict explicit; it should induce greater change than Condition 2 which leaves the basis of socio-cognitive conflict implicit and has high social distance. Condition 2 should be stronger than Condition 3 which has low social distance, but affords no socio-cognitive conflict. Underprivileged girls who have more to learn should be more sensitive to this.

Because subject numbers were likely to become small when testing Hypothesis 2, the tests made were confined to trend tests of the hierarchy 1, 2 and 3, and were not extended to comparisons between each and every other condition.

Hypothesis 3 We also expected that the 'experimental history' of *S* during the study would affect behaviour on the post-test. In particular those *S* who had shown sensitivity to the Experimenter-Child versus Dolls condition in the pre-test (*viz*. underprivileged girls) should react to this dimension on the post-test following experience of Condition 2, modelling - the child is external to the problem, as in the sharing of the juice between two dolls in the pre-test, and communication is less contingent.

However we would expect this differentiation to disappear when learning occurs after the directly involving interaction in Conditions 1 and 3.

We would also expect Conditions 1 and 3 to have differential effects on post-test behaviour. In Condition 1 *S*s will have seen beaker D (thinner than A and 'perceptually' holding 'more' juice therefore) given to their conserving peer and will have heard him justify the fairness with conserving arguments about the apparent inequality of juice in spite of their equal social status. Subjects who then receive beaker A on the post-test and have to share with an adult who receives a C glass (wider and smaller) should consequently transfer more readily to the new situation in spite of the inequality of social status between adult and child and perform better than their peers who receive beaker C. However in Condition 3, *S*s will not have heard such conserving arguments and might remember the experimental situation as an opportunity to share equally among peers.

Hence in the post-test the relative social status of adult and child should be important. They will feel that getting as much juice as the adult at the start is unfair and getting more (when the adult pours his own juice into C) even more awkward! It might even be suggested that those *Ss* who are given beaker A and had to transfer the juice into the wider beaker C may be afraid of losing the advantage they had been granted at the start and struggle (cognitively) to preserve it.

Treatment of results

The criteria used to assess performance for the first two sub-tests were the same as those used in the pre-test of Study 1 (Index 1). A second index (Index 2) took into account the whole post-test performance (including the third sub-test with beakers C and D): subjects were given one point for each correct answer.

RESULTS

Tables 9 and 10 set out the conservation performance on the post-test for all *Ss*. Table 11 summaries the differences found.

TABLE 9
Conservation levels of privileged boys and girls on post-test following modelling Condition 2

Sex	Conservation level							
	NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
Boys	0	4	0	0	2	1	0	7
Girls	0	3	0	0	0	1	0	4
N	0	7	0	0	2	2	0	11

Hypothesis 1 The summary of results in Table 11 shows no effects of either social origin or sex on the post-tests. This confirms the prediction that social origin would cease to be differentially associated with test performance and shows that the underprivileged girls 'recovered' from their earlier relatively poorer performance.

Hypothesis 2 Tables 12, 13 and 14 set out the results relevant to the hierarchy of effects between Conditions 1, 2 and 3 (interaction with C > modelling > interaction with NC) (Jonckheere test with ties). It was predicted that underprivileged girls would be most likely to exhibit this effect as they were the most likely to learn most being

TABLE 10
Post-test conservation levels as a function of experimental conditions and sex

	Conditions	Sex	Conservation level							
			NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
1	Interaction with conserver	Boys	0	1	0	0	1	1	0	3
		Girls	0	3	0	0	4	2	0	9
		N	0	4	0	0	5	3	0	12
2	Interaction with modelling adult	Boys	0	3	0	0	2	0	0	7
		Girls	0	6	0	0	5	0	1	12
		N	0	9	0	0	7	2	1	19
3	Interaction with non-conserver	Boys	0	8	1	0	1	2	0	12
		Girls	0	9	0	2	4	0	0	15
		N	0	17	1	2	5	2	0	27

TABLE 11
Synopsis of post-test conservation level differences as a function of social origin, sex, and intervention conditions

Group		Difference	*z*	*p*
Condition 1	underprivileged	Sex	0.00	0.50
Condition 3	underprivileged	Sex	0.01	0.50
Condition 2	underprivileged	Sex	0.31	0.38
	Privileged	Sex	0.12	0.45
	All *Ss*	Sex	0.03	0.39
		Social origin	0.53	0.25
All Conditions	all *Ss*	Sex	0.06	0.47
		Social origin	0.33	0.37
	Boys	Social origin	0.01	0.49
	Girls	Social origin	0.38	0.35

the weaker on the pre-tests). The effect was predicted for the initial post-test, on the generalisation items of the post-test, and on the conservation of matter.

For the underprivileged girls the hierarchy was present both on initial post-test and on this score supplemented with the generalisation items; it was not present for the conservation of matter scores. For boys the effect did not achieve significance for Index 1; it did on Index 2 in which the generalisation items were included. (It should be noted that the test for conservation of matter used only a three point scale of achievement.)

TABLE 12
Conservation items passed on post-test as a function of experimental conditions (underprivileged *Ss*)

Experimental conditions			Items passed[a]									
			0	1	1	3	4	5	6	7	8	*N*
1	Interaction with conserver	Boys	0	0	1	0	0	0	1	0	1	3
		Girls	0	0	2	0	1	2	2	0	2	9
		N	0	0	3	0	1	2	3	0	3	12
2	Interaction with modelling adult	Boys	0	0	2	1	0	1	1	0	2	7
		Girls	0	0	5	1	0	2	2	2	0	12
		N	0	0	7	2	0	3	?	2	2	19
3	Interaction with non-conserver	Boys	0	0	8	0	0	2	0	0	2	12
		Girls	0	0	8	1	2	3	1	0	0	15
		N	0	0	16	1	2	5	1	0	2	27

[a]Post-test: 2nd index with generalisation items

TABLE 13
Conservation of matter as a function of experimental conditions and sex (underprivileged *Ss*)

Experimental condition			Conservation of matter			
			NC	I	C	*N*
1	Interaction with conserver	Boys	1	1	1	3
		Girls	4	1	4	9
		N	5	2	5	12
2	Interaction with modelling adult	Boys	2	2	3	7
		Girls	4	2	6	12
		N	6	4	9	19
3	Interaction with non-conserver	Boys	6	3	3	12
		Girls	7	6	2	15
		N	13	9	5	27

Hypothesis 3 The two relevant aspects of social history within the experimental session were the degree of personal involvement, as realised in the peer interactions (Conditions 1 and 3) versus the modelling condition, and the variations in beakers experienced. Data in Table 15, 16 and 17 show the results. As in the pre-test under-

privileged boys did not react to the differences in dolls *vs* experimenter presentation. Neither did the underprivileged girls remain sensitive to this dimension, if they have previously interacted with a peer within the experiment; in contrast observation of the model in condition 2 left them sensitive to the discrimination ($z = 1.90$, $p = 0.028$).

TABLE 14
Synopsis of the relative effects on conservation of the experimental conditions (underprivileged *Ss*)

Conservation tests		Test of order of Efficacy 1 > 2 > 3		
		N	*z*	*p*
Conservation of liquids (1st index identical to the pre-test index)	Boys	22	1.30	0.09
	Girls	36	1.80	0.03
Conservation of liquids (2nd index with generalisation items)	Boys	22	1.57	0.05
	Girls	36	2.13	0.01
Conservation of matter	Boys	22	0.85	0.19
	Girls	36	1.11	0.13

TABLE 15
Post-test conservation performances as a function of experimental conditions, setting and sex

	Experimental manipulation	Conditions of administration	Sex	Conservation level							
				NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
2	Modelling adult	Experimenter-Child	Boys	0	1	0	0	1	2	0	4
			Girls	0	1	0	0	4	0	1	6
		Dolls	Boys	0	2	0	0	1	0	0	3
			Girls	0	5	0	0	1	0	0	6
1	With conserver	Experimenter-Child	Boys	0	0	0	0	0	1	0	1
			Girls	0	1	0	0	0	2	0	3
		Dolls	Boys	0	1	0	0	1	0	0	2
			Girls	0	2	0	0	4	0	0	6
3	With non-conserver	Experimenter-Child	Boys	0	4	0	0	1	1	0	6
			Girls	0	4	0	1	2	0	0	7
		Dolls	Boys	0	4	1	0	0	1	0	6
			Girls	0	5	0	1	2	0	0	8

TABLE 16

Post-test conservation performances as a function of type of beaker and experimental conditions

	Experimental condition	Beaker type	Sex	Conservation level							
				NNC	NC	I_1	I_2	C_0	C_1	C_2	*N*
2	Modelling	Beaker A kept	Boys	0	3	0	0	1	1	0	5
		(AF condition)	Girls	0	1	0	0	2	0	1	4
		Beaker C kept	Boys	0	0	0	0	1	1	0	2
		(CE condition)	Girls	0	5	0	0	3	0	0	8
1	Interaction with conserver	Beaker A kept	Boys	0	0	0	0	1	1	0	2
		(AF condition)	Girls	0	0	0	0	1	2	0	3
		Beaker C kept	Boys	0	1	0	0	0	0	0	1
		(CE condition)	Girls	0	3	0	0	3	0	0	6
3	Interaction with non-conserver	Beaker A kept	Boys	0	5	1	0	0	1	0	7
		(AF condition)	Girls	0	7	0	1	0	0	0	8
		Beaker C kept	Boys	0	3	0	0	1	1	0	5
		(CE condition)	Girls	0	2	0	1	4	0	0	7

Table 17 shows that boys were not responsive to the difference in beakers. The girls were differentially responsive if they had experienced conditions 1 or 3 but not if they had been exposed to modelling (Condition 2). After Condition 1, girls performed better if they kept beaker A (as the conserver did) and in Condition 3 after having beaker C (having a struggle not to be deprived?). These results are based on relatively low numbers of subjects and are not very strong; they are important, however, if corroborated in subsequent investigations. Indeed it seems that it is mostly those non-conserving subjects who had beaker A during the social interaction in Condition 3 who exhibited differential reactions to beaker arrangement in the post-test ($z = 2.15, p = 0.01$ for girls; $z = 1.42, p = 0.07$ for all subjects).

Certainly the results as a whole illustrate that the subjects's immediate social history in the experiment can account for at least part of his later capacity to offer responses in different social settings. We can further see from the 'type of beaker' effects for example that the 'social history' derives its meaning *only within a particular sequence* of events; as a function of prior experience it was either more *or* less facilitative to receive beaker C rather than A in the final post-test. In an important sense these are of course not 'type of beaker' effects, but interactions between the components of the

TABLE 17
Synopsis of post-test conservation effects as a function of all variables

Sex	Conditions of administration	Experimental conditions	*N*	Statistical effects *z*	*p*
Boys	Experimenter-Child	2	7		not tested
	vs Dolls	1	3		not tested
		3	12	0.09	0.53
	Type of beaker	2	7		not tested
	AF *vs* CF	1	3		not tested
		3	12	0.28	0.39
	Distributing first	3	12	0.09	0.53
Girls	Experimenter-Child	2	12	1.90	0.03
	vs Dolls	1	9	0.74	0.22
		3	15	0.03	0.48
	Type of beaker	2	12	1.03	0.15
	AF *vs* CF	1	9	1.54	0.06 (AF > CE)
		3	15	2.14	0.02 (CE > AF)
	Distributing first	3	15	1.39	0.08

experimental history of the subjects and the socio-cognitive characteristics of the context in which the subject must perform. One of the consequences of this observation is that at different moments in the learning process the same social group of subjects is not equally sensitive to the same dimensions, as for example in the case of the underprivileged girls whose performance was not affected by type of beaker on the pre-test, but was on the post-tests subsequent to interchanges with peers.

EVALUATION OF RESULTS

In this experiment we provoked a cognitive structuring in children in three phases (pre-test, learning session, and post-test) in order to observe their cognitive evolution in reaction to their social environment. It is apparent that these reactions cannot be understood without taking into account the child's social position within the task that he is asked to master and his anterior social position with respect to related tasks. But we still need to refine our conceptual framework to explain how these positions relate to one another. We have shown that the meaning of given social positions in an experimental

situation can be linked to previous social experience of this situation. But still it needs to be investigated how these social positions created within the experimental setting relate to the subject's positions within the wider social group: why are there no clear differences in our experiment between the boys and the girls of the privileged social group but marked differences in the underprivileged group? Why do boys of the two contrasted social groups differ from the girls? Why do girls in the underprivileged group seem to react like the 'most underprivileged'? If it is obvious that the social status of women and men in our society, of girls and boys within the families, is not equivalent in many situations, it still is not clear how these differences link with differences of the kind displayed in these results.

Learning: A process of performing and communicating within a social context

In earlier research (Perret-Clermont, 1980) evidence was produced that stresses the importance of social interaction and especially of cooperative activities among peers on the same task for the development of cognitive competencies in children. A series of experimental studies of different conditions of social interaction sustained the hypothesis that the socio-cognitive conflicts that these cooperative activities make possible are responsible for cognitive re-structurings that take place. The present experiment also suggests that the more the *object* of this conflict is clear for the child (for instance when he is directly involved, defending his share, etc.) the more it is likely to be fruitful for cognitive development.

But what makes this object clear? How does a child understand what the whole thing is about? How does he come to realise what is expected of him? How does he transfer his thinking from one social situation to another? Several authors have shown how the social components of a situation can affect the quality of a subject's performances. This we have also found in the performances exhibited in Study 1. But the second part of the present experiment tends to show that the same processes that are involved in the performing contexts are at work in the learning contexts. Performing and learning are related processes. When a child is asked to do something in a testing situation he must understand what is asked of him, and this he will do if the intersubjectivity he shares with the experimenter is sufficient and if he has practice in communicating his appraisal of the task in the form he is asked to produce. If not, he will need

to learn to decode and interpret what is left implicit and what the expected answers are. A closer look at the effects of countersuggestions could be interesting in that respect since there is experimental evidence (Mugny, Doise and Perret-Clermont, 1976; Lévy, 1980) that these do have a cognitive effect on the subject. We would suggest that unless the subject already has full mastery and practice of the specific requirements involved, he will always be elaborating his response within the testing situation in which he has to produce it: 'learning' there, on the spot, to produce it. This elaboration will be for the subject more or less facilitated by the social context, its explicitness and its meaning within the social relation in which the child is involved.

At present, in the light of our current experimental data, it seems to us that the main difference found among the four social groups studied is that underprivileged subjects need more than their privileged peers and girls more than boys to be given *during the testing sessions* opportunities for cooperating - *and hence for engaging in socio-cognitive conflict*! - with the adult experimenter.

Given such opportunities either via direct adult-child interaction about a real activity that makes communication contingent or via the communication of what the expected behaviour is (modelling), or being introduced in a session in which socio-cognitive conflicts are facilitated by a peer presenting a different point of view - the differences in performances between the social groups can be considerably decreased.

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