

## **Social comparison of expertise: Interactional patterns and dynamics of instruction**

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### **Abstract**

The aim of the present study is to examine the effects of social comparison on individual performance after an interaction session and the variation of the interactional dynamics depending upon the reciprocal perception children have of their level of expertise. The experiment is a pretest-interaction-posttest design with two experimental conditions manipulating the reciprocal perception an expert and a novice have of their level of expertise. Results show that the novices gain more individual benefits when they think they have the same level of expertise as the expert during the interaction session than when they believe themselves to have a lower level of expertise. Further results concerning the interactional dynamics of the interaction session show that there are more collaborative patterns when the children perceive themselves as equal. The presentation of the latter results will constitute the core of this paper.

### **I. Introduction**

Research on the role of peer interaction in cognitive development has so far focused on the cognitive and social conditions enabling a child to benefit from a peer interaction session: a first approach has been to compare the child's performance before and after an interaction session (pretest-posttest comparison) (PERRET-CLERMONT, 1980; DOISE & MUGNY, 1984; PERRET-CLERMONT & NICOLET, 1988; GILLY, 1989); a second approach has been to analyse the interaction sessions in order to describe the interactional patterns which account for children's appropriation of knowledge (ROGOFF, 1990). Whereas the first approach has usually been adopted by post-Piagetian scholars trying to uphold Piaget's claim that peer interaction is an essential factor of development, the second approach has been used either by post-Piagetian or by post-Vygotskian researchers: the former with the aim of looking for interactional patterns, explaining improved performance between the pretest and the posttest, while the latter aimed at studying how the partners (generally an expert and a novice) could reach a joint attention and construct an intersubjectivity within the novice's zone of proximal development (TUDGE & ROGOFF, 1991; WERTSCH, 1991). Although their theoretical framework and their aims were not the same, these lines of research have both emphasized the role of two main processes: socio-cognitive conflict on the one hand and intersubjectivity on the other (GROSSEN, 1988). The point common to both these studies has been to focus on the socio-cognitive processes responsible for the appropriation of a new competence, but to some extent they have neglected the relational setting in which the socio-cognitive

processes are mobilized (LIGHT, 1986; PERRET-CLERMONT, PERRET & BELL, 1991; SCHUBAUER, PERRET-CLERMONT & GROSSEN, 1992). With regard to this point, a few questions may be asked: which are the interactional conditions necessary for the construction of an intersubjectivity? In which conditions are the partners able to solve the socio-cognitive conflicts they experience? When the partners' competence is asymmetric, is the expert's point of view necessarily taken into consideration by the novice? With what consequences for the organization of their interactions? These questions refer to two classical problems within the field of social psychology: the first concerns the perception of the source of influence and the second the role of social comparison processes in the construction of self and other identity.

The general hypothesis of the present study is that in some social situations, the reciprocal perceptions of the partners might either facilitate or inhibit the taking into account of the other's point of view and hence differentially contribute to promoting the search for a cognitive solution to solve conflicts.

The aim of this study is to examine the links between the individual benefit children take from the interactional dynamics and the partners' reciprocal perceptions. Our main hypothesis is that perceiving the partner as equal affects the way the children interact with the each other and take their partner's perspective into consideration. Perceiving the partner as equal should facilitate the construction of an intersubjectivity and hence the cognitive solving of the socio-cognitive conflicts which could occur during the interaction session.

We shall first present the experimental procedure. We will then recall the main results concerning the pretest-posttest comparison in order to present our new data concerning the interactional patterns observed in the two experimental conditions during the oral presentation of our paper.

## II. Presentation of the study

### 1. Procedure

The task requires a mastery of right and left recognition and is inspired by a study done by Claude Dalzon in Aix-en-Provence (France) (DALZON, 1992). The procedure consists of a four-step experimental design, which is a variation of the classical pretest-posttest design (cf. figure 1).

Figure 1: Experimental design

PRETEST	
CONDITION 1 Attribution of unequal level of expertise	CONDITION 2 Attribution of equal level of expertise
INTERACTION SESSION	
POSTTEST	

The first step is an individual pretest consisting of three series of subtests:

- a) the first series concerns right and left recognition on oneself or on an object oriented in the same direction as the child (0° subtests);
- b) the second series concerns right and left recognition when the object forms a 90° angle in relation to the child's body (90° subtests);
- c) a third series concerns right and left recognition when the object forms a 180° angle in relation to the child's body (180° subtests)

The novices recognize their own right and left, but not that of an object oriented at 90° or 180° in relation to their own body, while the experts have a good mastery of the right and left on objects oriented at 90° or 180° although they do not have full mastery of it. After the pretest, dyads of experts and novices of the same sex are constituted.

The second step is an "attribution session" in which equal or unequal perception of expertise is manipulated. Children are called two by two, a novice and an expert, into a special room of the school. They are told that first there will be a training session to get familiar with the task. Each dyad is presented with a short path drawn on the floor. One child after the other has to guide a LOGO floor turtle from the beginning to the end of a path without straying from it. For the purpose of the experiment, only three programmed cards (FORWARD, TURN LEFT, TURN RIGHT) are proposed to the children. The situation is manipulated in such a way that in condition 1 (unequal attribution) only the expert is able to guide the turtle without straying from the path, while in condition 2, both the expert and the novice are led to perceive themselves as being equally capable.

The interaction session immediately follows the attribution session. Both children sit at one end of the path and give orders to the experimenter by means of cards (on which is written FORWARD, TURN LEFT, TURN RIGHT) that they put in a small basket. They have to guide the same turtle along a longer path made up of 14 turns:

7 form a 90° angle in relation to the child's body ("easy turns"); 6 form a 180° angle in relation to the child's body ("difficult turns") and a turn which forms no angle in relation to the child's body, this will not be taken into consideration for the analysis. Carrying out the task correctly therefore implies the mastery of right and left after a 90° or a 180° rotation in relation to the children's position.

The last step is an individual posttest undergone both by experts and novices which is the same as step 1.

### 2. Hypothesis

The main hypothesis is that the perception by the child of his/her own expertise has a differential impact on the relationship the children establish during the interaction. We expect the "equal attribution" condition to bring about more collaboration between the children and the "unequal attribution" to reinforce the expert's leadership, thus resulting in different types of interactions. The experimental conditions should also have a different impact on individual benefits in the posttest: we expect the children of the "equal attribution" condition to gain more expertise than the children of the "unequal attribution" condition.

### 3. Subjects

The population selected after the pretest resulted in 52 seven to eight year old children, 26 in each experimental condition. The novice and the expert of each dyad were of the same sex.

### 4. Results

We shall first present the analysis of the individual cognitive gains between the pretest and the posttest. We shall then examine some results regarding the analysis of the interaction session. The other results will be presented orally.

#### 4.1. Comparison between the pretest and the posttest

The comparison between the pretest and the posttest has been carried out separately for each series of subtests. One of the indicators measuring the evolution between the two sessions is the frequency of regressions, stabilities and progressions in each experimental condition. The performance of the novices in the 90° subtests shows that the frequency of subjects progressing between the pretest and the posttest is significantly higher in the equal condition:

SUBTESTS 90°				
	Regressions	Stabilities	Progressions	N
Condition 1 (unequal)	5 38%	3 23%	5 38%	13 100%
Condition 2 (equal)	1 8%	2 15%	10 77%	13 100%

Table 1: Subtests 90°: Frequency of regressions, stabilities and progressions between the pretest and the posttest in each experimental condition. (Jonkheere test:  $z = 0.185$ ;  $p = 0.03$ )

As table 2 shows, the tendency is in the same direction for the 180° subtests, although the difference is not statistically significant:

SUBTESTS 180°				
	Regressions	Stabilities	Progressions	N
Condition 1 (unequal)	4 31%	4 31%	5 38%	13 100%
Condition 2 (equal)	3 23%	2 15%	8 62%	13 100%

Table 2: Subtests 180°: Frequency of regressions, stabilities and progressions between the pretest and the posttest in each experimental condition. (Jonkheere test:  $z = 0.75$ ;  $p = 0.32$ )

Table 3 presents the number of subjects progressing in neither the 90° nor 180° subtests, the number of those who progress in one of the two series and the frequency of those progressing in both series. Subjects are progressing more frequently in both series of subtests in the equal attribution condition than in the unequal one.

SUBTESTS 90° and 180°				
	No progress	Progress in 90° or 180°	Progress in 90° and 180°	N
Condition 1 (unequal)	4 31%	8 62%	1 7%	13 100%
Condition 2 (equal)	1 7%	6 46.5%	6 46.5%	13 100%

Table 3: Subtests 90° and 180°: Number of novices in each experimental condition. (no progress; progress in 90° or 180° subtests; progress in both subtests) (Jonkheere test:  $z = 0.185$ ;  $p = 0.03$ )

Concerning the results of the experts, the table 4 shows no significant difference between the experimental conditions. However, if we look at the raw scores, we observe a difference, statistically significant, the experts of the equal attribution condition progressing more than those in the unequal attribution.

SUBTESTS 180°				
	Regression	Stabilities	Progressions	N
Condition 1 (unequal)	4 31%	2 15%	7 54%	13 100%
Condition 2 (equal)	4 31%	-	9 69%	13 100%

Table 4: Subtests 180°: Frequency of regressions, stabilities and progressions between the pretest and the posttest in each condition. (Jonkheere test:  $z = 0.31$ ;  $p = 0.37$ )

#### 4. 2. Analysis of the interaction sessions

All the interaction sessions have been registered on videotapes and transcribed along seven dimensions. We shall focus here on two of them:

a) the decision: how do children reach a decision about the order to be given to the turtle? And who takes the decision?

b) the actions: who puts the card in the basket?

For each dimension, the level of conflict is taken into consideration.

The first step of our work has been to examine who makes the decision. We expect the proportion of joint decisions to be higher for the FORWARD orders than for the "easy" and the "difficult turns" orders and the experts to make the decision more frequently in condition 1 than in condition 2. The next table shows how the decision is taken depending upon the type of orders and the experimental conditions:

	Condition	Novice	Joint	Expert	N	N condition 1 and 2
Forward	Condition 1 (unequal)	11 6%	128 66%	53 28%	192 100%	383 100%
	Condition 2 (equal)	23 12%	139 73%	29 15%	191 100%	
Easy turns	Condition 1	17 19%	22 25%	49 56%	88 100%	179 100%
	Condition 2	39 43%	16 18%	36 39%	91 100%	
Difficult turns	Condition 1	17 23%	18 24%	39 53%	74 100%	152 100%
	Condition 2	35 45%	16 20%	27 35%	78 100%	

Table 5: Who makes the decision depending on the type of orders and the experimental condition

A non-parametric analysis of variance calculated on these data indicates that there is a significant effect of the experimental conditions ( $k=23.63$ ;  $p<0.01$ ) but no significant effect of the type of order ( $k=1.28$ ;  $p=0.47$ ) and no significant interaction between these two variables ( $k=2.97$ ;  $p=0.17$ ). Whatever the type of order, experts always make more decisions in condition 1 (unequal attribution) than in condition 2 (equal attribution) and the reverse is true for the novices who more often make the decision in condition 2 (FORWARD:  $z=3.32$ ;  $p=.0004$ / "Easy" turns:  $z=2.84$ ;  $p=.002$ ) "Difficult" turns:  $z=2.68$ ;  $p=.003$ ).

We will present orally the second step of the analysis concerning specific behavioural patterns. The results show that the patterns of interaction observed for the "easy" and the "difficult turns" vary depending upon the experimental conditions, but only when it is the expert who decides which card to choose and not when it is the novice who leads the choice.

#### Conclusion

The results of this study show that the perception the expert and the novice have of their own expertise and of that of their partner has an effect on the benefit they draw from an interaction session. When the partners perceive themselves as being of equal expertise, the novice gains more competence between the pretest and the posttest. The analysis concerning the interaction session itself shows that the interactional patterns

vary depending upon the experimental conditions, with more collaborative patterns in the condition in which children perceive themselves as equal. Further analysis is now necessary to examine the links between individual performance and the type of interactional patterns observed during the interaction session.

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