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Peer imitation in children: imitators show communicative attitude only when they copy "effect-less" actions

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ABSTRACT

This field study assesses children's relational attitude when they imitate other children. We observe that 3.7- to 5.4-years-old children show communicative attitude toward the model when they reproduce "effect-less" actions, but not when they copy target actions.

INTRODUCTION

As pointed out by Elsner (2007), imitation studies in developmental psychology have predominantly focused on the reproduction of target actions (or "effective" actions), that is, sequences of movements performed in order to initiate determined and desired changes in the environment (e.g., Brugger et al., 2007; Flynn & Whiten, 2008; Lyons et al., 2007; McGuigan et al., 2007; Nielsen et al., 2012). In contrast, imitation of "effect-less" actions (such as the production of a mere succession of body movements) has been less studied. Some studies show that preverbal children, from at least 12 months of age, are able to encode and reproduce "effect-less" actions, but that they are much more likely to reproduce actions oriented toward determined external targets, and more effective in their reproduction than in the reproduction of "effect-less" actions (Bellagamba & Tomasello, 1999; Carpenter et al., 2005; Elsner, 2007; Huang et al., 2002; Meltzoff, 1995). Yet, studies carried out by Nadel (1986, 2002) clearly show that children between 18 and 30 months frequently and spontaneously engage in imitations of actions that are devoid of such external targets – as, for example, carrying a small chair above the head while freely moving in a room.

What could explain these seemingly paradoxical results is that, unlike the other studies mentioned, Nadel's (1986, 2002) research focuses on *peer imitation* in children: the model is not an adult who performs a specific action, but a child whose way of playing with an object is imitated by another child. In such a context, imitation fulfills a function of social communication: by reproducing the way

the model plays with the object, the imitator communicates to him his similarity, his proximity (on the communicative function of imitation, see: Chartrand & Bargh, 1999; Lakin et al., 2008; Meltzoff, 2005; Nadel et al., 1999). It may well be that preverbal children spontaneously use this mode of communication mainly between them. This would explain the fact that adults' actions imitated by children are preferentially those that allow them to learn something, that is to say, "effective" actions (on the learning function of imitation, see: Gergely & Csibra, 2005; Nielsen, 2009; Tomasello, 1999; Want & Harris, 2002).

In a natural setting, do older children spontaneously imitate "effect-less" actions performed by other children? And do they display a similar communicative attitude when they reproduce "effective" and "effect-less" actions? To answer these questions, we observed spontaneous *immediate peer imitations* on 3.7- to 5.4-years-old children in a daycare center (Study 1). However, we had the opportunity to observe very few imitations of "effective" actions in this context (unlike imitations of "effect-less" actions). To supplement the data from our observations, we then encouraged the same children to produce imitations of "effective" actions by making them take part in a learning task requiring them to imitate a peer (Study 2). In both studies, we recorded for each imitation sequence whether the children involved exchanged glances, whether they synchronized their movements, and whether the imitator smiled (or laughed) to the model – these behaviors being indicative of communicative attitude (Nadel, 1986, 2002).

STUDY 1

Materials and Methods

Study 1 focuses on observations of spontaneous immediate peer imitations on 3.7- to 5.4-years-old children (mean: 4.44 y/o) in a daycare center. The selected group of children consisted of 11 girls and 14 boys. They all regularly attended the daycare center and were thus familiar with each other. The observations were made at intervals of two hours twice a week for 2 months (about 36 hours of observation in total). These observations were made during free playtime and collation time in the morning. We used the method of "behavioral sampling", which systematically records the occurrence and the characteristics of a specific behavior – in our case, *immediate peer imitation* – in a group of individuals and within a defined time (Altmann, 1974; Lehner, 1998). Data collection was performed by "direct written recording" (McGrew, 1972). The two authors were present simultaneously in the field, and they took their written records separately.

The observed imitations were coded according to the following three indicator behaviors considered separately:

1. Presence of exchange(s) of glances between the imitator(s) and the model.
2. Production of laughter and/or smile(s) directed at the model.
3. Presence of behavioral synchrony between the imitator(s) and the model (at least two successive movements simultaneously performed by the children).

A sequence of imitation involving several imitators is coded as meeting one of these indicator behaviors only if all imitators have presented at least once the behavior in question during the sequence. In a sequence of imitation, the "model" is defined as the child who first began to perform the action that is reproduced by other children (the "imitators").

We then separated the observed imitations of "effective" actions from those of "effect-less" actions. An "effective" action is defined as a sequence of movements performed to initiate a determined and desired change in the environment (Elsner, 2007).

The two authors coded the imitations separately, on the basis of their respective field notes.

Results

We observed 39 cases of immediate peer imitations in total:

- 37 are imitations of "effect-less" actions: in 32 of them we notice the presence of exchange(s) of glances between the imitator(s) and the model; in 32 of them we notice the production of laughter and/or smile(s) directed at the model; in 35 of them we notice the presence of behavioral synchrony between the imitator(s) and the model. (See *Table 1*)
- Only 2 are imitations of "effective" actions: in those 2 imitations, there is no exchange of glances between the imitator and the model, nor production of laughter and/or smile directed at the model, nor presence of behavioral synchrony between the imitator and the model.

The observed imitations (N=39) involve 1 to 7 imitators (mean: 1.74), and last 10 to 208 seconds (mean: 59 sec.). Nineteen children (12 boys, 7 girls; min.: 3.7 y/o, max.: 5.2 y/o, mean: 4.53 y/o.) of the 25 constituting the group took part as imitators in at least one (max.: 10, mean: 3.58) of the 39 imitations. Twelve of the imitations of "effect-less" actions include the use of an object (e.g., playing with a doll in the same and unconventional way as another child). The other 25 imitations of "effect-less" actions consist in the simultaneous reproduction of sequences of repeated, fragmented, and exaggerated body movements. The 2 imitations of "effective" actions consist instances where a child copies the way another child is assembling two objects in order to obtain a new one, and uses it as the model does.

STUDY 2

Materials and Methods

Study 2 focuses on imitations of "effective" actions in children. The group of children is the same as in Study 1. We encouraged them to copy a sequence of manipulations produced by another child on a specific device, namely an opaque box which releases a "bouncing ball" (the reward) after three ordered separate manipulations are performed.

The procedure is as follows: a child is randomly chosen as a model, and he is brought into a separate room. One researcher explains and demonstrates the correct use of the box to the child, who can then practice on it as needed, and he tells him that he can keep the ball if he repeats the task several times in the presence of one of his mates. Another child, the imitator, is then invited to sit next to his friend. A second researcher tells him that the box is a new toy, which allows him to win a ball, and that his mate (the model) already knows how to use it. After the model carries out two demonstrations in the presence of the imitator, a second box, identical to the first, is given to him. The researcher informs him that he can now also play with his own box, and that if he succeeds in getting the ball 3 times, he can keep it. A ball is then introduced into each of the boxes at the same time, and the two children are observed while they manipulate their boxes. The sequence ends after the imitator gets the ball three times. Until this is the case, the model continuously manipulates his own box to get the ball (the ball is put back into the box every time he gets it). A child who has been the imitator in a sequence can take on the role of the model in a subsequent sequence.

The sequences were all recorded in their entirety, with two digital cameras, one filming children's faces, the other filming their manipulations of the box. Both authors did the coding, from recordings viewed separately, and according to the same three indicator behaviors as in Study 1.

Results

We conducted a total of 13 sequences of imitation following this procedure. Three of them were excluded because of the child's uncooperativeness. The remaining 10 sequences of imitation last 79 to 365 seconds (mean: 214 sec.). During these 10 sequences, as they were trying to get the ball from their own box, 7 on the 10 imitators have observed many times the manipulations of the model. Yet, in the 10 observed imitations, there is no exchange of glances between the imitator and the model, nor production of laughter and/or smile directed at the model (the imitators focused their attention on their own manipulations and on those of the model, and they sometimes looked and smiled at the researchers). We notice the presence of behavioral synchrony in only one case. (See *Table 1*)

GLOBAL RESULTS

	Immediate peer imitations of			
	"Effect-less" actions (N=37)		"Effective" actions (N=10)	
	Number	%	Number	%
Presence of exchange(s) of glances	32	86.49	0	0
Production of laughter and / or smile(s) directed at the model	32	86.49	0	0
Presence of behavioral synchrony	35	94.59	1	10

Table 1 – Comparison of the attitude of the imitator(s) toward the model in imitations of "effect-less" actions (Study 1) and in imitations of "effective" actions (Study 2). The two imitations of "effective" actions observed in Study 1 are not included in the table.

DISCUSSION

Results of studies 1 and 2 show that the attitude of 3.7- to 5.4-years-old children dramatically differs depending on whether they reproduce other children's "effective" or "effect-less" actions. Contrary to what happens when they imitate "effective" actions, children adopt a clear communicative attitude when they copy "effect-less" actions: they exchange glances with the model, they smile at him, and they synchronize their movements with him.

This difference in attitude may certainly be explained by the fact that, when children reproduce "effective" actions, they are learning what those actions allow them to do. Their attention is therefore focused on the *actions* they are observing in order to reproduce them, and not on the model. In this case, the model is an *informant* for the imitator, and it is the information contained in the sequence of movements (produced with a well-defined purpose) that attracts the attention of the imitator. Conversely, when children copy "effect-less" actions, it is the *interaction* with the model that interests them, more than the specific movement he produces. In this case, the model is a *playmate* for the imitator. This interpretation of our results is in line with Over and Carpenter's (2012, 2013) hypothesis that, when imitation is performed to fulfill a learning goal, "[…] children are more focused on the characteristics of the task […] than in their relationship, or interaction with the model", whereas when "[…] social goals predominate, the child seeks to be like the model without any attempt to learn a new skill. In these cases, the match between the child's behavior and the model's behavior is of paramount importance" (Over & Carpenter, 2012: 186-187). For Over and Carpenter, the matching between the partners' behaviors is achieved through the faithfulness of the imitation (*faithful imitation*, versus *selective imitation*). But, as shown by Nadel (1986, 2002) and in this study, this matching can also be carried out by the temporal synchronism of the children's movements during imitation.

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