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ABSTRACT

Using observation and analysis of children's interactions with their environments, this study evaluated the quality of parent-run day care centers. Observation reduces the degree of subjectivism, respects the integrity of the child-care situation, and allows one to witness the actual effects of the environment and to observe the combined effect of multiple factors. The study focused on proximal environment defined in terms of interactions with the environment that facilitated children's discovery and understanding of their world. Environment was defined as the entire situational context in which children develop. Observations took place at four parent-run schools between January and June 1994. Observations were made from videotapes; over 44 hours of data were analyzed. Results of analyses included the following: (1) the degree of parental participation affected the degree of complexity of children's interactions with their environment; (2) children benefitted more or less from complicated interactions depending on whether they came from socioeconomically advantaged or disadvantaged backgrounds; and (3) adults' levels of interactions varied with children's age. (Contains 27 references.) (JW)

The quality of the Environment of the Child : Study of Cognitive Interactions in Parent-run Preschools

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summary

How to assess the quality of the child environment? In order to evaluate the benefits of a programme, we elaborate a method based on cognitive outcomes. It consists on close observation and analysis of the child's interactions with his/her environment, mainly interactions with others about objects of this environment. This paper reports the advantages of the observation method and some of the results we obtained in order to evaluate the role of parents in creches in the child cognitive development. Main results are that parents have a better responsiveness: (i) as they do not have routines to provide assistance to the child, they are closer of what the child is actually doing, (ii) as a group of individuals in parent-run preschool, the knowledge they transmit while interacting with the child is a rich environment in terms of knowledge and know-how.

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Some children are born into and grow up in disadvantaged milieus. The features of these disadvantaged milieus can be analysed in terms of their disadvantages for the child. Certain institutional programmes are considered advantageous to the child because they offer a privileged environment to offset the child's own environment. Again, the features of these programmes can be analysed in terms of the advantages they provide for the child. The results of this analysis can then be used to determine their quality. The problem is how to analyse the quality of an environment.

In order to evaluate the benefits of a programme, one might consider such factors as the cultural background, poverty, and educational beliefs and practices of the parents and professionals surrounding the child. For example, one might study how a preschool compensates for the effects of economic poverty by offering the child more than its family can offer.

Whatever factors are selected for study, their effects cannot be determined until one has established the nature of the data that will be used in evaluating the factors. Katz (1992) recently identified five different approaches to assessing the quality of an environment, based on a study of 800,000 references in the data base of the Educational Resources Information Center (ERIC). These five approaches represent five categories of questions which can be put to programme directors, the children themselves, their parents, their teachers or to the neighbourhood and target audience. The Katz recommended approach is to consider the children themselves. This is also our point of view. But, as Katz noted, questioning young children is hardly an easy matter!

We have taken a new perspective in our assessment of the quality of the child's environment. It consists of *close observation and analysis of the child's interactions with his/her environment*. By this we mean the interactions that are available in the course of everyday life within the given programme.

1.The advantages of the observation method

We shall concentrate here on four of the main advantages of our method of observation:

It reduces the degree of subjective interpretation

The interactions are recorded on video. There was no mediation between the reality of what the child was being experienced and what we analyse. This is in direct contrast to techniques such as questionnaires[1] completed by parents[2] about what they think[3] their child[4] receives from the preschool[5*] .

It respects the integrity of the work programme

A programme sets itself a number of goals, as well as the means to those goals. Our general point of view, which we will not debate here, is that it is better to observe the application of the means than the achievement of the goals. Inasmuch as the child's interaction with an environment entirely or partially made possible by a programme represents a momentary actualisation of the means applied by that programme, the method used here seems well-suited to an efficient reading of these means.

It enables the actual effects of the environment to be observed

In the literature on the subject, there are generally two sorts of indicators for the quality of an environment for a child:

- the potential or conditional indicators (e.g., for a preschool: the available space, the quantity of toys available, the number of adults present, etc.);
- and the indicators of results (satisfaction of the parents, proper socialization of the children, progress of the children's level of intelligence, etc.).

By concentrating on the interaction between the child and his/her environment (adults, other children, objects), our method aims to give a more accurate and precise evaluation of the way in which "things really happen" in the daily life of children at preschool.

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* "1 to 5" indicate the various intermediaries between the child's experience and the observable material as gathered in the questionnaire.

It enables the combined effect of multiple factors to be observed

By studying interactions, we can feel sure that no factors will remain unseen due to their absence during the observation period. The interactions observed repeatedly over a reasonable length of time demonstrate not only the application of various factors, but also—and more importantly—the interactions between these factors. For that matter, the interactions between factors do not always produce the expected results: a spacious preschool with a lot of adults would seem to offer two positive conditions for environmental quality, but these very conditions can sometimes cause unexpected negative effects, such as the isolation of certain children.

Although we consider our general method to be original in its approach to the quality of the child's environment, it is not something new. It is the product of two theoretical fields: (i) the Cognitive Sciences; more specifically, Problem Solving and Cognitive Ergonomy, and (ii) Developmental Psychology; primarily the study of cognitive interactions between children and adults.

On this score, the goal in the presentation of this study is twofold: The main objective is a method of observation and analysis, and its the application to the child's environment through the use of video data on the child's interactions with this environment. The second objective is to examine, using the proposed method, the quality of parent-run preschools for disadvantaged children.

2.The quality of cognitive interactions

The interactions can be analysed in several ways. One can concentrate on the affective aspects, on the aspects relating to the child's socialization or education, on the activities which take place during the exchanges, etc.

We are interested here in an aspect which we consider primordial for the child's development, namely the child's discovery and understanding of the world. Our interest for the child's cognitive development is justified by two interdependent reasons which result, firstly, from our sense of what it is most important to give the disadvantaged child in terms of quality of environment, and, secondly, from the specificity of the given field of observation, the Parent-run Preschool.

In straightforward, common sense terms, the first reason can be expressed as follows: the essential quality of a profitable environment for disadvantaged children is that it should supply them with knowledge and encourage their integration. The second reason is due to the specific nature of Parent-run Preschools and has to do with the presence of parents in the preschool, working alongside the professional staff and taking care of the children on a daily basis. The quality of the presence of the parents has been well-recognized and defended on account of its affective aspects (This, 1988). On the other hand, the cognitive benefits of this presence are entirely unknown. These two reasons determine the nature of our observable factors: indicators of the cognitive richness of the interactions taking place in Parent-run Preschools as an overall indicator of the quality of the environment being offered to disadvantaged children.

The two dimensions of affectivity and intelligence are rather different in nature. Their opposition can be noted in their differing requirements in terms of stability and imbalance, oneness and diversity. A harmonious emotional development requires stability and a certain exclusivity (uniqueness) in the relationship to the parents. A harmonious cognitive development, by contrast, will tend to require an imbalance generated by the contradiction and diversity of points-of-view on various objects and situations, expressed in an atmosphere alternating between balance and imbalance (cf. Piaget's concept of "maturing equilibriation").

The presence of the parent (father or mother) in the preschool ensures the harmonious socialization of the child by making his/her experience of separation easier. We consider this to be taken for granted. The presence of other parents working alongside the professional staff ensures diversity and an alternation between balance and imbalance—both necessary for cognitive development.

3. The proximal environment defined as interaction

By "child's environment", we mean the entire situational context in which the child develops. This context includes the various places where children go (preschool, home), the objects they see and touch, the people (teachers, parents, siblings, peers) with whom they interact, the languages and words they might hear, understand and produce, and the beliefs (tastes, moral judgements, points of view) they come to share.

"The child's milieu" has a differential and comparative value. It is one part of the child's environment that is used in order to discriminate between children on the basis of characteristic traits, such as the socio-professional category of the parents (working class versus white-collar), the family origin (migrant or not), religion, etc. Hence, "having up to four brothers and sisters" is not a relevant trait in differentiating the milieu if most of the children have up to four brothers and sisters. On the other hand, having seven or more is a salient trait in characterizing the milieu.

In our research, we have focussed on the child's environment, because the features which define "the child's milieu" are not directly involved with our hypothesis. For example, there is no direct relation between the sociocultural level of the parents and the cognitive richness of the interactions they offer their children. We have taken the child's effective environment as our concrete focus, rather than the potential environment (for example, a preschool might be equipped with certain pedagogical games and never use them). In addition, we have not only approached this environment in its totality (the elements making up the effective environment appear repeatedly in the observed interactions), we have also examined the way in which the child responds to this environment. That is to say, *how* he/she uses it.

The environment we have chosen to study is the proximal environment, defined in terms of interactions. The underlying, specifically environmental necessities are implicit: for example, the assistance provided by an adult during his/her interaction with a child presupposes:

- the presence of this adult,
- his/her availability (not occupied with another task at the same time),
- his/her concentration on what the child is doing (not distracted by other events),
- his/her motivation in the interaction (feeling able to interact, understanding why and wanting to do so),
- his/her beliefs regarding the child's development,
- beliefs regarding his/her own teaching skills.

The assistance given also presupposes a place in which the child and adult can meet, a place which allows this interaction to occur. And, finally, this assistance requires some kind of material support for the interaction.

The specifically environmental necessities of the interaction can, in our opinion, be subtracted from the description of the interaction itself. The relation follows by implication: if this or that interaction is reported here after being observed in the preschool, it means it has satisfied these necessities. On the other hand, as we have seen, the existence of these necessities does not guarantee that the potential interactions will take place, it merely provides the conditions for them to occur. By contrast, if these necessities are not satisfied, the related interactions are impossible.

Our method of observing the child's environment is to observe the child's interactions with this environment. Above all, we analyse these interactions from the point of view of their value in the child's development. But what should this environment be like? What should its structure be?

4. Nature and Structure of a profitable environment for the child

Our theoretical approach has taken its inspiration from a scientific current starting with Piaget (1977) and culminating in the present-day Cognitive Sciences (Newell & Simon, 1972; Johnson-Laird, 1988; Anderson, 1993). This current considers the intellectual development of the child from the standpoint of his/her acquisition of knowledge as it is progressively structured in the form of semantic networks of categories (Collins & Ross, 1969; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976; Jackendorff, 1983) and is then restructured following the phases of imbalance. This knowledge is of a variety of sorts:

- knowledge of objects (Gleitman, 1990), including oneself (body image, etc.), and of others,
- knowledge about actions, including schemes (Piaget, 1929, 1978), which express the acquired relations between objects and actions on these objects,
- knowledge of the progress of events, including scenarios (Richard, 1990),
- knowledge of one's own thoughts (Oléron, 1981),
- knowledge of the thoughts of others (judgements, intentions, claims, expectations)(Flavell, 1988).

This approach is in opposition to those which assume a pre-formed structure in the child (Fodor, 1992) or which grant a crucial place to the child's maturation (Rondal, 1979).

It holds that the competence of the child should not be reduced merely to his/her "performance". The aim of the cognitive system is to create representations—of objects and of the relations between objects—which contribute to the child's understanding and interpretation of the world. This is why the child is "naturally" drawn to perceptual complexity, followed by cognitive complexity. The child acquires skills even when he/she can't express them yet in the form of "visible performances". In relation to this, we consider that there is no limit to the amount of "richness" required in the child's environment (in terms of games, colours, people, words, language). Indeed, it is the pertinence an object has for a child that makes that object part of the child's knowledge (something he/she recognizes, knows how to use, or even name). This pertinence is acquired through action, in the larger sense of the word: identification, imitation, manipulation in play, performance of tasks, problem solving (Tijus, 1994a, 1994b), interaction with others (peers, siblings, parents)—i.e., when the child itself intervenes and receives a response (he/she tosses a ball and it bounces; people reply when he/she speaks).

It is the child's actual utilisation of the world that determines its efficient structure for him or her. Nevertheless, this structure is also limited by the fact that the child is an affective being (loved, loving, subject and object of pleasure and displeasure) (Crow & Crow, 1960), and must go through the process of socialization (learning what is good and bad, cooperation with others) (Santolini, 1994)..

The child creates a theory of the objects of the world (Piaget, 1929) and a theory of thought (Perner, Ruffman, & Leekam, 1994). Its theory of the world is the integrated organisation of its knowledge regarding the objects in its environment. Thus from very early on, the child conceives of its environment in large categories: things that do not move on their own (furniture, walls), things that are alive (and move about on their own or move parts of their body) and, among the living things, those that are familiar, and among the familiar things, the father and mother, the family pet, etc.

In speaking of a theory of thought, we mean the child's knowledge of the mental conceptions of other people. We know that very early on the child acquires the conception that other people can be mistaken, either by error (looking for the toy in the wrong place, when they ought to know where the toy is), or by ignorance (looking for the toy where they think it is, but it is no longer there).

It is crucial that this structure be set up within the child. It is, by definition, the support for all symbolic activity in the child due to its multiplicity of meanings.This structure exists mentally, locally, for physical objects (Jackendorff, 1983), animals (Collins & Ross, 1969), artifacts and man-made objects (Rosch et al., 1976), the meaning of verbs (Gleitman, 1990). It is supported by the language (kitty, cat, animal; rob, nick, steal, take), the syntax (Gleitman, 1990) (Peter takes Mary to school/Peter takes a book: three arguments in one case against two) and the words ("I" against "you", etc.).

The theory adopted by the child on the basis of this structure is conceptual. It is a theory of intelligence, since this structure includes abstract categories which are not visible in the child's environment. Some of the properties of objects are discovered by means of our actions on them (a ball rolls because it is round and "round things roll"). On the other hand, what justifies these abstract classes cannot be observed or manipulated (nothing allows the child to see and know that cats and dogs are two different species of animal).

Nevertheless, it would seem that it is primordially important for children to acquire a solid representation of such knowledge, since we have seen that the quality of this representation has positive effects on children's overall cognitive capacities: problem solving (Richard, Poitrenaud, & Tijus, 1985), memorization (Ehrlich, 1985), understanding and reasoning (Johnson-Laird, 1988), acquisition of new knowledge (Riley, Greeno & Heller, 1982), learning procedures and understanding action, and, especially, learning to learn (Oléron, 1981).

How would an environment that helps children make this acquisition be structured? This structure is acquired in the course of the child's exchanges with other people regarding the objects in its environment, that is to say, in the course of its interactions.

We can speak of an interaction taking place when "individuals in each other's company have a reciprocal action on each other with regard to a referent or a shared activity and the channel for this action is accessible to the participating individuals" (Beaudichon, Verba, & Winnykamen, 1988, p.133). Similarly, we can apply the term "interaction" to a "series of at least two related socially oriented behaviours" (Nadel, 1991). The cognitive interaction is a situation which implies more than a simple exchange or a relation, because in addition to the effect one person has on another, it assumes a responding effect of this person on the first.

In the course of an interaction, various "objects" are manipulated. These can be words used to designate other things, pieces of games or construction sets, etc. Their existence in the course of the interaction gives them a presence that is more or less rich. Take for example the simple reading of a picture book for children, in two different situations of interactive reading where the adult has the child name the things represented in the images:

First situation:
Adult: "What's this?"
Child: "A rabbit."
Adult: "And what's this here?"
Child: "A duck." (and so on...)

Second situation:
Adult: "What's this?"
Child: "A rabbit."
Adult: "Do you know what the rabbit does?"
Child: "Yes... it eats carrots."
Adult: "Yes. And it **jumps** too, and when it is **wild**, it **runs very fast**..."
Adult: "Now let's go on to the **next one**. What's this here?"
Child: "A duck." (and so on...)

More properties are expressed in the second situation, even though it still lacks, for example, an expression of categories ("animal") and of relational properties ("jump like a kangaroo").

Our method to evaluate programmes about what they provide for disadvantaged children has been guided by the idea that intellectual development is primarily founded on the discovery of the specific properties of objects in the child's environment, as well as the relational properties

between objects and the utilisation of these properties (in problem solving, to make learning easier). In doing so, we have granted a great deal of importance to the integration of knowledge and, especially, to the development of meta-knowledge (knowledge about knowledge). Understanding what someone says, for example, is not just to understand the meaning of the words, but to grasp the person's "point of view". Knowing something is to know its pertinent properties, i.e. those which are relevant to the action in question, those which help you understand what is happening, what might have already happened and what is going to happen.

How can the child recognize the pertinent properties of an object in a given situation? One way is by imitation, especially in a dead-lock situation (when the considered properties do not respond to the context in question), or to have someone indicate them to us, or, above all, to be confronted with a point of view that contradicts our own. Becoming aware of a contradiction is to become aware of the richness of the world through the diversity of its contexts ("that's true there, but not here"; "we can do this at school, but not at home").

We use the term "richness of cognitive assistance in the interaction" to designate what is profitable for the child in the cognitive assistance provided by his/her partner. The cognitive hint is an assistance whose explicit or implicit purpose is to encourage the child to think in greater depth about what it is doing—to reflect upon, reason about and comprehend the activity—but not always just in order to succeed at the activity in question.

If a young child is making a tower of blocks but piling the cubes in such a way that the tower is likely to fall over, we can help her succeed by fixing the position of each block ("let's make the tower together and we'll succeed"), but this does not teach her to pile the cubes correctly, let alone to imagine that the tower will fall over.

If we let her build the tower in an increasingly unstable fashion without saying anything, the child will discover the results of her mistake (the tower falls over), but will not understand the justification for these results.

By announcing the imminent collapse of the tower, we orient the child's attention towards what is happening and enable her to make the connection between the building process and the result.

By announcing the imminent collapse in relation to the way the child is placing the blocks ("look at what you are doing, the tower is going to fall over"), we establish the relation between the cause and the results.

5. Observing and Analyzing the Parent-run Preschool programme

Parent-run Preschools (Parental Creches) are day-care centres for children from 6 months to 4 years old in which the parents participate in the pedagogical activities (usually a half-day per week per family) under the supervision of the professional staff (usually educators trained in early-childhood care) and, in some cases, in the management of the centre.

Each centre is managed by the parents' association which defines a sort of community that collectively determines the structure of the school and makes collective decisions on various points such as hygiene, safety, pedagogy and funding.

For participating parents, the Parent-run Preschool offers a certain number of advantages: gentle separation from the child without an abrupt break ("our child is not a package left at the door of the day-care centre in the morning and picked up again in the evening"), a community-oriented life and responsibilities, a collective project to be completed, a strong sense of solidarity with other parents, and friendships which often last long after the passage in the preschool, a network of mutual aid extending beyond the children themselves (housing, employment, exchange of services, etc.).

Above and beyond their specificity as Parent-run Preschools, these centres enhance the families' integration into their neighbourhoods, create exchanges and networks of aid and solidarity among families and, above all, are equipped with procedures for assisting disadvantaged people.

One of these procedures is, for example, to always take in the child of a mother who needs to put her child in care for an important social reason (employment, administrative papers, etc.), even if the mother was not previously enrolled at the preschool.

What interests us in the case at hand is to know what contribution the Parent-run Preschool makes to children from disadvantaged milieus. According to our above definition, the environment—in terms of interactions—should be a very rich environment.

- First of all, the children receive different sorts of mediation, different sorts of interactions and different sorts of responses from the adults.
- Second of all, the parents acquire a sense of pedagogical responsibility from the preschool. They come to see themselves as "educators" and they think about various pedagogical aspects, thus developing their pedagogical skill. The latter, according to our operational working hypothesis, will be linked to their degree of participation in the life of the preschool.

6. A method to study of the environment in terms of interaction

Given our view of cognitive interactions as a powerful factor in the development of the child's thinking, we consider that a good degree of what the environment provides to the child will consist simply in the accomplishment of these interactions. The first analysis of the interactions is to regard them as the execution of tasks.

The interaction as a task in itself

The value of this method is that it provides a formalism to the description of interactions which is entirely independent of their contents. This is the first time, to our knowledge, that a method issuing from task analysis has been applied to the analysis of interactions.

What is meant by task analysis? Task analysis is a well-known method in the context of ergonomic cognitive psychology. It is held that in order to accomplish a task, one needs a general goal, that of the task itself. This goal is composed of a certain number of sub-goals. More importantly, the accomplishment of a goal or sub-goal is related to conditions and prerequisites which themselves depend upon: the environment, the subject executing the task, and the progress of the task.

As regards the *environment*, a poor environment will provide few opportunities for interaction. The learning and training provided to the subjects and the free time they are allowed will have an incidence on their involvement in the interactions.

As regards the *subjects*, aside from the children who may be expected to profit from the interactions, there are the professionals, for whom the interactions are a prescribed task: their training has motivated them for this task and given them the knowledge to go about it. This is also the case for the

parents participating in the Parent-run Preschools: the way in which the environment favours the parents' participation (internal regulations of the association, time spent on site) and the way in which the parents themselves take part in the interactions will determine the execution of these interactions as well as their quality.

As regards the *progress of the interactive task*, we have concentrated on the more or less complete character of the interaction, its degree of elaboration or complexity. The first level is obviously the absence of interactions. If a child remains alone all day in a preschool, without the slightest cognitive exchange with anyone other than the most functional interchanges (receiving its meal, being changed, being put to bed), the reference environment cannot be considered as a propitious environment for the child's development.

Finally, in considering the interaction as a task, we are able to study its progress by formalizing a certain number of prerequisites which determine the existence of an interaction and its degree of completeness, that is to say its degree of complexity. In this way, we can identify a difference between two similar environments—or two video sequences—in which an adult is involved in various material tasks and does not have the time to take care of the children. In the first, it may be clearly seen from the adult's glances that she is keeping an eye on the children, while in the second environment, the adult does not look at the child at all. The first environment meets one of the prerequisites for the possible existence of an interaction (not to mention the other effects of the glance, such as risk prevention).

The same may be said of the responses given by the adult to the child's demands. Not only is the satisfaction of this second prerequisite even more important to the execution of the interaction, but when it is met it automatically means that the other prerequisites have been met as well (looking at the child, watching what he/she does). In this fashion, we can list the prerequisites by order such that the satisfaction of each prerequisite means that the previous prerequisites have also been met. In characterizing the interaction by the most complex prerequisite according to their order on the list, we are able to obtain an indicator of the degree of execution of the interaction. Furthermore, this may be done independently of the contents of the interaction (Theme), the time devoted to it (Duration) and the people involved in it (Actor).

The contents of an interaction in terms of the richness of its objects

The descriptions of the objects appearing in an interaction and used by the partners will have varying degrees of richness. We have analysed the contents of interactions by analysing the properties of the objects handled by the partners. Starting from the object's mode of existence (in the form of a physical and/or figural object (drawing/photo) that may or may not be named or written), we have identified the following properties in objects:

- the existential properties
- the expressive properties or attributes
- the categorial representations of the object
- the declarative relational properties
- the simple procedural properties
- the causal procedural properties
- the inferences made with respect to these objects

The purpose of this is to record the richness of the interaction in terms of cognitive exchanges. This sort of description applied to the objects used in an interaction is clearly independent of both the theme of the interaction and what the actors do in the course of that interaction.

The contents of an interaction in terms of assistance to the execution of a task

In the course of an interaction, the tutors also provide the child with assistance in executing the task chosen by the child or given to him/her by the tutor. Before the task and in the course of its execution, we can identify the following forms of assistance:

- evocation of the task to be solved
- directing the child's attention
- evocation of the final results of the problem
- attributing the means for the child to solve the problem
- attributing the procedures.

And, after the task has been solved:

- simple evocation of the results
- correction (of various sorts, including self-correction)
- congratulations.

Treatment of the data in studying the interaction

The coding resulting from an analysis of interactions in terms of prerequisites to the execution of interactive tasks has allowed us to identify fifteen more or less elaborate categories of interaction. Furthermore, this gives us a description of the objects used during the interactions according to the properties used, as well as a typology of the pedagogical styles according to the task.

The *analysis* consists in seeing how these types are divided up among the actors: professionals in early childhood development, little-participating parents and fully-participating parents. This should allow us to determine the contribution of parental participation not just from a quantitative standpoint, but also, and more importantly, from a qualitative standpoint.

7. Observation and treatment procedure: analysis of the interactions in Parents-run Preschools

From January to June 1994, a team composed of one psychologist and one cameraman visited four different Parent-run Preschools, first presenting the research project to the centre and then filming the interactions taking place there. The filming was limited to one day per week, the same day each time. In addition, in order to collect data on other activities not occurring on the day of filming, the team occasionally recorded on other days of the week. The resulting video data was very rich and complete, and it constitutes the observable material at our disposal for this study.

The observation unit

In observing natural data (i.e. from the field, and not produced by the researcher), the observation unit is primordial. It must not vary from one group of data to another, nor among the different researchers, and it must be sufficiently well-defined for two researchers to be able to divide up the body of data in an equivalent fashion. The body of data used here is a group of video sequences filmed in Parent-run Preschools. A video sequence is constituted by an interaction in which at least one person is occupied with an activity over a certain length of time.

The initiative for each sequence comes from the intentions of the field observers (psychologist and cameraman), who have decided to film a given scene over a given duration. The end of a sequence may have a variety of types of causes: the end of the activity itself followed by the end of the recording, the end of the activity followed by another activity which constitutes a new interaction, a decision that no additional information will be gained from continuing the filming, the abandonment of one scene in order to film another. The initial intentions in the decision to film will be used as the primary criteria for the observation unit.

First criteria: the **theme** of an observation unit for an interaction is the activity which the observers have decided to record. It is defined in the first few seconds of the recording ("the observers wanted to film theme X").
Second criteria: the **duration** of an observation unit is the length of time that the theme represents the activity being recorded. If, for example, the contents of a sequence shows an adult reading a book to a child and then stopping in order to bring the child to table for a snack, the sequence includes two observation units.
Third criteria: the **actor** in an observation unit is a person who enters in the field of the activity (and not just in the field of the camera). In the recorded duration of an activity, there are as many units as there are people who intervene in the course of the filming of the activity.

To summarize, an observation unit is composed of an **actor** with respect to a **theme** which has a **duration** of a certain length of time. Simply stated, this means a person who takes part in an activity which the observers have decided to film.

The unit of analysis

Since the goal of the analysis is to study the contribution to children—in terms of interactions and the richness of these interactions—made by Parent-run Preschools in disadvantaged neighbourhoods, the unit of analysis will be the observation unit, together with additional information on the interaction (other people taking part, nature of the interaction, indicators of the level of interaction, etc.), as well as indicators of its richness from the cognitive point of view and indicators on the cognitive assistance given during the interaction.

The statistical unit

The statistical unit is the unit of analysis together with various identificational elements which enable the unit of analysis to be assigned to different categories. These categories are diverse and absolutely independent of the observer and researcher: date the sequence was filmed, location of the filming, cassette number, indications on the elements of the observation unit (data on the actor, e.g. age and, in the case of an adult, function, nature and degree of participation in the preschool, socioprofessional indicators, information on the type of theme, the duration and the time-code).

All the additional features which distinguish the statistical unit from the unit of analysis are elements of information which were available before the observation and filming period. They are independent of the observation and subsequent analysis. The observer and researcher may ignore them in the course of their respective tasks. The categories, according to their relevance, are considered to be modalities of the different factors (type of preschool, type of family, type of parental participation, etc.); they are used for the purposes of statistical comparison.

Finally, the statistical analysis allows a certain number of comparisons to be made:

- Global comparisons such as the degree of interaction provided by the participation of parents.
- Longitudinal comparisons such as the evolution of the degree of interaction in the mid-term (for the duration of our observation period in the preschools), again in order to measure the contribution made by the participation of parents.

8. Results provided with the method

Over a six-month period, collected data was representing respectively 722, 717, 808 and 399 minutes of videotaping. In total, there were 2646 minutes, or more than 44 hours of data. The number of statistical units was of 2496 for roughly 771 interactions recorded. An interaction lasts on average for 2 to 3 minutes and is broken down into roughly 3 statistical units (person, theme, partner). The coding we have applied can be seen to be a very detailed coding of daily life in the preschool, as perceived through the interactions taking place.

Firstly, the theme of the interaction should be taken into consideration for its influence on the level of interaction ($F=28.1$, $P<.001$). The activities which raised the highest levels of interaction were reading and problem situations such as puzzles and abacuses. Situations involving music, symbolic communication, role-playing and discussion were favourable to the exchange of affection.

Comparative analysis of the interaction's degree of complexity according to the various persons present in the Parent-run Preschools

The types of interactions were rated on a scale from 1 to 15. All the adults present in the preschools (fathers, mothers, professionals and trainees) interacted with the children: from simple verbal and motor addresses (1 to 5) to longer-lasting verbal exchanges (6 to 8) to genuine acts of assistance in cases where the child could not complete the task alone (9 to 15). The adults sought out the children and responded to their questions at an average level of complication of 5.4. The fact that the daily life of the young child features more situations of free play than of problem solving is the explanation behind the somewhat average value that was recorded. Lastly, the children's interactions with mothers were on the same level as their interactions with the professional staff.

In addition, it may be noted that the adults' level of interaction varied according to the age of the child (1.3 for children under one; 3.8 for one-year-olds; 4.4 for two-year-olds and 5.2 for three-year-olds). The more complex interventions were addressed to the older children. This would suggest that the adults were able to evaluate the child's proximal development zone according to their age and to adjust their behaviour in consequence.

Comparative analysis of the interaction's degree of complexity according to the effects of the Disadvantaged Character

On the basis of the disadvantaged character of the parents (Very, Somewhat or Not Very Disadvantaged), we observed that mothers from not very disadvantaged milieus presented a higher level of interaction (7.1) than mothers from somewhat (5.9) and very (5) disadvantaged milieus.

In addition, the children seemed to benefit from more or less complicated interactions as a function of their disadvantaged character: 4.15 for the Very Disadvantaged, and respectively 5 for the Somewhat Disadvantaged children and 4.87 for children of Not Very Disadvantaged parents. Nevertheless, this difference diminished as the children increased in age and as a function of the time spent at the Parent-run Preschool, since the degree of interaction of children of Very Disadvantaged parents was equivalent to that of children of Not Very Disadvantaged parents. In itself, the Parent-run Preschool seems to remedy the effects of poverty over time.

Comparative analysis of the interaction's degree of complexity according to the parental participation

The degree of parental participation had an effect on the degree of complexity of the interaction (from the cognitive standpoint): parents who participated a great deal in the life of the preschool learn to communicate with the children: developing longer-lasting interchanges, getting the children interested, imitating, and exchanging tips with other parents on questions such as "how to read a story". In general, the degree of participation had a very marked effect on the degree of complexity of the interaction (both the parents and the children learn how to interact). Very Disadvantaged parents whose participation was high had a higher level of interaction than Very Disadvantaged parents whose participation was low .

9. Discussion and Conclusion

The method was first used to analyze the child's environment in Parents-run Preschool. On the basis of the results obtained in the course of our research and according to our criteria for analysis, we can put forward several elements in response to the question: What are the positive aspects of the environment in intercultural Parent-run Preschools?

After observing the evolution of the effects of participation on the degree of interaction over a six-month period, it became clear that parents who participate most will be met with an increase in the degree of complexity of the interactions they are involved in. It would seem that parental participation counteracted the lack of complexity in the interactions.

Furthermore, parental participation also had an effect on the degree of complexity of the interactions undertaken by the children: children whose parents participate more had richer interactions (regardless of the identity of the partner) than children whose parents participated little. It is possible that children of parents who participated a lot felt more "at home" or at ease, and consequently they initiated richer relations with their partners.

The last two sets of results (manipulated properties and assistance to task execution) show that the cognitive development of the child, particularly children from disadvantaged milieus, can be favourably affected by such factors as exchanges of points of view among parents, exchanges between parents and professionals, and an acceptance of responsibility by the parents for the neighbourhood and the centre attended by their child.

The main results of this research, as well as a precise description of the method can be found in Tijus, Santolini & Danis (1994). We report, in the context of a description of the educational environment of preschools, how we chose to concentrate on the interactions and how we elaborated the method we have presented here. In this, we have adopted a post-Vygotskyian theoretical perspective which insists on the importance of interactions in the cognitive and social development of the child, and which places this development in the context of human relations of increasing levels of complexity. The other is seen as an essential factor in individual development, acting simultaneously on three levels: the child's motivation for learning, the child's sense of the meaning of this learning and the child's execution of the tasks of learning (processes and performances).

This theoretical framework also places particular emphasis on the active role of the child in the interactions it has with the tutor, as expressed in the idea of the child's appropriation of knowledge, know-how, skill acquisition and means of acquisition. Our perspective is based on the idea of hierarchical levels of cognitive interaction. Among the criteria underlying these levels are involvement, responsiveness, and the structural complexity of the interactive task.

- **Involvement** of both partners implies their active and reciprocal participation in the interaction.

- **Responsiveness** in the tutor implies taking into account the capacities of the other, the learner, and adapting one's assistance in order to make it more effective.

- **Structural complexity** concerns the degree of difficulty of the interaction as a task to be solved, its level of complexity. It implies a relatively high degree of prerequisites and, consequently, of occasions for learning. These are grouped by degree of complexity in levels of interactions ranging from the most primitive to the most elaborate. The higher degrees imply high levels of involvement and responsiveness.

These criteria describe the quality of the interactions, that is to say the social potentialities for learning provided by the various reference environments.

Working from a non-reductionist standpoint, we did not limit ourselves to a study of the cognitive elements enabling us to describe the interactions. We gathered data on other elements, albeit less differentiated, but nevertheless providing us with useful information on other components within the interactive situations.

Lastly, it should be noted that our method was a functional one. Because the interaction necessarily requires prerequisites, the satisfaction of the prerequisites may be taken as an indication of the level of complexity of the interaction. This method is not culturally centered. It is equally valid for all cultures.

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