emotional resonance: a mirror system for emotions of children with autism spectrum disorders

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Data Analysis

The school is one of the contexts in which the child spends most of his/her day, therefore, the school intervention is key to improve the quality of social inclusion and the degree of child's autonomy, increase and improve all the socially significant behaviors, and reduce their problems by setting up highly individualized programs. The implementation of the project required special training and constant supervision by qualified personnel who provided the flexibility to adapt to individual learning needs.¹² Our goal was to create a strong network between families and professionals specializing in autism spectrum disorders (psychiatrists, psychologists, neuropsychomotor therapists, developmental physical therapists, and speech therapists) in order to offer individualized habilitation interventions within the family, social, and academic context. It was intended to improve the educational program for children included in the school context by introducing elements of psycho-educational interventions that are valuable for the development of a more appropriate individualized educational plan. The data collection of the project, inspired by the treatment Floor Time, was preceded by the interviews with the participating families (figure 1). This initial phase was therefore represented by the assessment that was aimed at making a diagnosis and the development of the functional profile of the child to assess areas of their strength and weakness at different developmental stages. All assessment sessions were based on an interview, anamnestic investigation where child's medical history and developmental milestones were recorded which were useful for evaluation of treatment effectiveness. Further, we began to gather information on the parent/teacher parenting skills/caring abilities. It provided us the opportunity to perform an initial analysis of the needs of the children and present the objectives and methodology of intervention. The proposed meetings with parents followed after 4 or 5 sessions of assessment of the child, parent/teacher, and

their interaction. The children were subjected to the administration of standardized tests that allowed us to diagnose and understand different developmental profile. A special session was devoted to the analysis of parent/teacher-child session that asked the parent/teacher to play 20 minutes with the child with a set of standard games. The parent/teacher underwent a series of questionnaires to enable further consideration of the child-caregiver relationship established. In the first phase of treatment, as stated previously, the teachers played a very active role and were involved for much longer periods than the parent. Purposes of this phase of data collection was to arrive at a more specific knowledge as much as possible by interactive mode of operation. In this phase, the teacher played with the child, selected the games adapted to their level of development, and sought to capture all its areas of interest. During these activities, the teacher verbalized child's mental states such as describing what interests them. The parent/teacher followed a two-level (concrete and representational) procedure in which they tried to build intersubjective relationship and begin to develop a form of reflective thinking on the operation of the child initially held only by the therapist. The educator showed through direct interaction with the child in the presence of a parent/teacher what are the ways to achieve success or failure, modulate affects and intentions of the child, make it more meaningful some of its manifestations. When the therapist opened a channel of communication with the child who involved the parent/teacher actively in the exchange procedure by starting a game between the two dyads: parent-child and teacher/educator-child. In the third phase, parent/teacher - child had already established a series of positive pattern and purpose of the intervention to help them on their consolidation and expansion. As previously mentioned, the task of the educator was to facilitate as much as possible the interaction of the child with its parent. At this stage, educators tried to make ways for the parent/teacher interaction by observing from a distance and intervening only in situations of conflict. The conflict was the central element

of this phase, in the sense that the task of the educator was to help the parent/teacher to manage the negative affect that may arise in the interactive activities. The teachers intervened with verbal prompts to resolve conflict by providing new approaches to encourage the child to be involved in the game. At a time when the parent/teacher acquired the ability to involve child regardless of the presence of the educator, the treatment had more therapeutic effect. This was discussed with parents and all the data related to the improvement of the child and their changes were shared with them to confirm data validity. Often here you decide which path to follow with children.

The project was developed, therefore, by alternating moments of observation and direct work with the children in the classroom, and meetings for discussion and exchange with the teachers and parents. Each meeting was organized on a monthly basis and last for 4 hours with the explicit goal to monitor the project progress and redefine individual student participation through the identification of new targets to pursue.

At the end of the meeting, operators discussed a summary report containing a description of activities and skills observed and some indicators drawn from the group. Those documents were then shared with the family. Thus, in addition to using the information family shared about their child's behaviors, we tried to match our observation to ensure standardisation of data collection. For all the children followed in the project, it was possible to make comparisons of educators observations with some private practitioners.

In order to collect and compile comprehensive information and viewpoints of all parties involved in the project (family, teachers and professionals), we prepared some grids: the evaluation of the children, the evaluation of the parent/teacher (compiled by us both operators), and the perception of the teacher (compiled by the teachers themselves). The treatment was made effective by efforts of teachers who tried to receive an answer to their questions and concerns regarding the management of the children with ASD in the project. The direct involvement of

Fig. 1: Floor Time setting.

the school and the family ensured that the skills acquired by students at school was not an end in themselves, but were instrumental in achieving other goals in different contexts of life situations.

Finally, a grid was designed for parents to evaluate the degree of satisfaction of family members, as well as the most comprehensive analysis of the process involving children and families. The scale of assessment for the children consists of 250 items designed to measure the child's functioning in about 11 areas of its curriculum: Game (play skills analyzes functional and symbolic role in the group with specific rules and shift), Autonomy (analyzing the problem-solving skills, the degree of autonomy achieved by the child during lunch, the fulfillment of bodily needs, personal hygiene, the entry/exit from school), Collaboration (examines the degree of collaboration in the child's response to requests or instructions of the adult); echoic Skills (analyze the child's ability to repeat sounds, words and phrases on a model), Notice (analyzing the child's ability to respond to specific requests of the adult, what I call see, to put specific requests to peers or adults); intraverbal Skills (analyze the child's ability to respond to questions about past events or objects that are not present, the ability to maintain a short conversation or respond to comments by an adult or a peer); imitative skills (analyze the child's

ability to imitate movements or sequences of movements); capacity visuo Space (analyzing the child's ability to estimate the spatial aspects of different objects, or relationships between the same objects); Academic Skills (analyze the child's academic skills related to its development, eg.: color, size, write, read, recognizes seasons or parts of the body ...), Social Competence (analyzes the development of social skills the child); Emotional Competence (analyzes the level of awareness of emotions, their recognition, their definition and the ability to link emotions to thoughts and situations that evoke). The expected response from each item allowed to ascertain the degree of skill reached by the children in each situation indicated and was recorded on a 5-point Likert scale (score from 0 to 4).

The scale of the parent/teacher consists of 42 items that aimed to detect relational mode of communication of the teacher who works in a preferential manner with the child.

The key areas covered in the scale are: communication (analyzing how the language used by the teacher with the child); Collaboration (analyzing the teacher's ability to develop or maintain over time the collaborative behavior of the child); Implementation aspects technical (relational mode analyzing teacher in relation to the basic principles of behavior analysis: the teacher motivates the child, pro-

motes good behaviors, etc.); analysis and management of problem behaviors (analyzes the teacher's willingness to analyze the child's problem behaviors in order to understand the function of behaviors and act on the factors that trigger them or keep them in time); Social area (analyzes the teacher's willingness to promote social contacts and exchanges with their child with adults in the school context). The expected response to each item was recorded on 5 points Likert scale (score from 0 to 4).

The scale of perceptions of the teacher consisted of 18 items that measured the perception of the teacher in front of the questions raised in the classroom of a student with ASD. In particular it allowed to detect the level of safety experienced by teachers in relation to the management of children in the school context. The answer was recorded under each item of the 3-point Likert scale (score from 0 to 2).

The scale for parents (customer) was composed of 14 items. Points are awarded on a Likert scale where score ranged from 0 to 2. The scale was completed at the end of the school year and aims to detect the level of appreciation of the project.

Results of Research

Our studies of mirror neurons was to connect the understanding of behaviors that manifest an intention to the prediction of behavior to come). Understanding of the mechanism of actions performed by others has been extremely useful to broaden the scope of investigation. The same mirror neurons about which scholars have said that their characteristics as well as activation mechanism at pre-reflexive stage determines the individuals around a shared space of action by other individuals, which arise ever more elaborate forms of interaction. In the field of evolutionary biology, evidently the formation of interaction skills took place simultaneously within the biological organism as its exterior, and this would help us to understand where to direct future research, given that their interactions are based on systems of mirror neurons increasingly complex, differentiated and articulated as they are studying. The ability of parts of the human brain to activate the perception of others' emotions, expressed through facial movements, gestures and sounds, the ability to instantly encrypt this perception in terms of "viscero-motor", makes each individual to act on

a neural mechanism to get what the researchers call "empathic involvement".¹³ The studies on mirror neurons tell us that it tends to stimulate the autistic child to make the movements required for everyday life and relate to others.

The recent experiments have confirmed that at instances of the behavior of the subjects, mirror neurons have been identified in areas of the brain and that are larger than those glimpsed at the beginning. The discovery of mirror neurons and their study has allowed us to make a leap in the knowledge of the brain to lay the foundation to investigate the neural processes responsible for the relationships between people. In practice, we are discovering the biological mechanism underlying the complex social behavior of person.

The 10 children who were involved in the intervention, were aged between 4 and 9 years (Fig. 2) Four children attend kindergarten and six primary school (Figure 3).

The data collected through questionnaires and the comparison between measurements made at the beginning and end of the project show that in all the areas studied by the student's curriculum advances have occurred (Figure 4).

In order to define precisely factors of change as determined solely by the treatment you need further investigation. However, we can consider the fact that progress in a comprehensive way involved all the skills of the child and therefore may have been produced by intensive stimulation. Similarly, the comparison between the measurements made at the beginning and end of the school describes a significant change in the mode of communication and social skills of teachers involved in the project (Figure 5).

Fig. 2: Involved children's age included in the 4 and the 9 years.

Fig. 3: Four children attend the childhood school and others are in the primary school.

The degree of satisfaction measured through questionnaires completed by parents reached a high score. The average score of all parents (20,75) reached the maximum value that each questionnaire could have achieved (28, range 0-28 of the questionnaire) (Figure. 6).

Discussion

Analysis of individual factors measured by the questionnaire suggest that the presence of the professional school increases the level of sharing of work objectives and the exchange of information between school and family. Furthermore, the expert in school raises concerns about the management of children. The parents say that they appreciate the project because it is possible to generalize the learning curve that took place in the family context. With regard to the opinion of teachers and the perception

of their effectiveness in the project as professional, it has been shown that the teachers played largely very positive role. The average of the scores achieved by the teachers interviewed on this factor constitutes 94.5% of the maximum score that could be achieved on each questionnaire if all items were given the highest score. In particular, many of them claim to have heard the support of professionals in defining and in carrying out work with child. The collaboration with teachers has thus helped to ensure adaptation to the individual needs of each student and therefore it was necessary and indispensable to the effectiveness of the intervention. The comparison between the magnitude of the changes implemented by the child and the magnitude of changes in the relational style of the teacher indicates that the level of the child's learning varies with the change of his teacher.

Fig. 4: I compare between the measurements made to the beginning and the end of the project show which in all the areas taken into examination by the Curriculum Vitae of the student happened of the progress.

Fig. 5: Significant change in the communicative and relational modes of the teachers involved in the project comparing the measurements made to the beginning and the end of the school year.

Fig. 6: The degree of satisfaction measured through the questionnaires filled in by the parents reached a high score.

The analysis of the collected data also shows that the level of satisfaction of the parents in most cases reflect the scope of progress put in place by the child. Similarly there is a high degree of satisfaction of the families where there is an improvement in the relational mode of the teacher and children and vice versa. Conclusively, we can say that the data collected in the current research supports the usefulness and usability of the intervention.

Conclusions

Compared to purely rehabilitative prospects of the development of early intervention programs the current intervention has opened the way to the hypothesis that intervening in an early stage of development can affect the mechanisms originating in autistic disorder and change radically. Generally research has been focused on an approach through which the treatment was built around the deficit but not around the mechanisms that underlined social

dysfunction, which this current research has tried to accomplish. In fact, the scientific community in this regard is now in agreement on some general characteristics that any proposed treatment should have. Since Treatment means encouraging the development of compensation strategies and actions to reduce the effect of basic social adaptation of the subject, the appropriate treatment must first be compared to early diagnosis and secondly must always include the involvement of parents and the extended family. Thirdly, it must be properly modulated in terms of intensity, duration, and stability over time to achieve the desired goal. The treatment should be complete and affect different areas of the child, as shown through the current research. The method proposed by Stanley Greenspan and Serena Wieder for example, can fully be proposed as a treatment that meets these characteristics.¹⁴

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