

Special Education for the social competences in Autism Spectrum Disorders. The role of the Pivotal Response Training

Saverio FONTANI¹

Abstract

The Pivotal Response Training (PRT) is currently one of the most effective models for the educational evidence-based interventions in Autism Spectrum Disorders. The model is based on Applied Behavior Analysis (ABA), and represents a naturalistic child-centered intervention for the development of appropriate social interactions. This paper presents the theoretical background and the relative implications for the inclusive educational intervention in the Primary School.

Keywords: special education, autism spectrum disorders, Pivotal Response Training, social competences, applied behavior analysis.

1. Introduction

The *Pivotal Response Training (PRT)* by Koegel & Koegel, (1988; 2006) represent one of the most effective models for the development of social competences in the Autism Spectrum Disorders (Schreibman, 2005; Steiner et al., 2013; Genc & Vuhran, 2013).

The model is strictly derived from the perspective of Applied Behavior Analysis (ABA), the most effective approach for the educational intervention in students with Autism Spectrum Disorders. Particularly, the ABA approach can to be considered as those characterized from high levels of effectiveness in promoting adaptive behaviors and social competences in child with ASD (Remington et al., 2007; Whalen, 2009). The validation of effectiveness of the PRT is derived from randomized studies on individual cases (Anagnostou et al., 2014; Cottini & Morganti, 2015). For this reason, the model is universally acknowledged as one of the most effectives for the development of social and

¹Saverio Fontani, Ph.D., Assistant, University of Florence- Department of Sciences of Education and Psychology, Florence-Italy. Mail: saverio.fontani@gmail.com

adaptive skills in students with ASD (Schreibman, 2005; Randolph et al., 2011; Fein et al., 2013). These considerations could lead to reflections on the introduction of knowledge of the PRT-derived training in the formative processes for the Special Support Teachers and for the educators involved in the answer to special educational needs of students with ASD (Koegel & Koegel, 2006; Anagnostou et al., 2014; Tyson et al., 2014). In this paper, the typical social and behavioral profile of Autism Spectrum Disorders is briefly described and the implications of the PRT for the educational interventions are discussed.

2. Social and cognitive profile of the Autism Spectrum Disorders

The ASD represent complex developmental disabilities, and the recent increases of his incidence (CDCP, 2014) justified the need for a deeper knowledge of the disorder and more effective models for the educational intervention systems. In the ASD the special education interventions play a significant role for the development of adaptive behaviors and, consequently, for the improvement of the Quality of Life (Smith et al., 2010; Minjarez et al., 2011; Fein et al., 2013).

The recent restructuring of the diagnostic criteria conducted in the *Diagnostic and statistical Manual of Mental Disorders* (DSM-5, APA, 2013) have produced a simplification of the indicators for the ASD and the specification of levels of his severity as a function of the quantity of the support requested by the environment.

In the DSM-5 the ASD are currently considered as a diagnostic macrocategory, which includes subjects with low or high cognitive functioning, specified by a series of eight criteria. The diagnostic criteria are divided in two categories: Deficits in Social Communication and Restriction-Repetition of the behaviors. The criteria are described in the tab. 1.

Tab. 1. Diagnostic criteria for the Autism Spectrum Disorders. Adapted from: APA, 2013.

Deficits of Social Communication

- 1) Deficits in social-emotional reciprocity. Abnormal social approach. Reduced interest in the sharing of interests and emotions.
- 2) Deficits in nonverbal behaviors used for the social interaction: Abnormalities in eye contact and body language. Deficits in the understanding and use of nonverbal communication. Lack of facial expression and gestures.

3) Deficit in developing and maintaining appropriate relationships. Difficulty in adapting behavior to different social contexts. Difficulties in sharing imaginative play and making friends. Apparent lack of interest for other people.

Restriction and Repetition of behaviors and interests

- 1) Language, motor movements or stereotyped or repetitive use of objects. Presence of motor stereotypies, echolalia or repetitive use of objects.
- 2) Adherence to the routine with excessive resistance to change.
- 3) Implications in abnormal interests with unusual intensity. Excessive interest in unusual objects.
- 4) Anomalous Interest with pervasive manipulation of objects and attraction to lights or rotating objects.
- 5) Impairment of responsiveness to sensory stimuli, with apparent indifference to hot, cold and pain.

Three levels of severity (*Relevant, Mild, Moderate,*) indicate the impairment of the social skills and of behavioral restriction, based on the quantity of support required to environment from the profile of the subject (APA, 2013).

The diagnostic criteria show the pervasiveness of the disorder on the children's social skills. The social profile ASD-related is profoundly influenced by the impairment of communication skills (Anagnostou et al., 2014). The most effective models of intervention, validated according to the perspective of the Evidence Based Education, present as a common denominator the early intervention on the deficit of communication (Schreibman & Koegel, 2006; early intervention on the deficit of communication skills and the development of skills of self-regulation of behavior; Anagnostou et al., 2014). Similarly, others common denominators of the more accredited models are those represented from the development of spontaneous communication skills and from the development of the understanding of environmental requests (Schreibman, 2005; Tyson et al., 2014). A similar emphasis on the need of educational interventions for the development of social skills is actually confirmed by the presence of explicit references to intervention on social deficit in the international Systems of Guidelines for the child (SIGN, 2007; ISS, 2011) and for the adult with ASD (BPS, 2012). These considerations can justify recourse to effective educational interventions models based on early intervention for the deficit of communication skills (Bishop-Fitzpatrick, Minshew & Eack, 2013).

The Pivotal Response Training, in this view, is an effective model for the development of communication skills and for the competences of self-regulation of behavior (Genc & Vuhran, 2013; Anagnostou et al., 2014). For a better understanding of the educational potential of the PRT, it seems appropriate to outline the theoretical background of the model.

3. The perspective of the Applied Behaviour Analysis

The Applied Behaviour Analysis (ABA) should not be considered as a specific model of intervention, but rather as a widely used approach to research in the intervention of ASD (Lovaas, 1993). This approach currently represents the most effective educational intervention for the treatment of ASD (Schreibman, 2005; Anagnostou et al., 2014; Tyson et al., 2014; Fontani, 2017).

An historical review of this approach must necessarily start from the pioneering contributions by Lovaas (Lovaas, 1987; 1993). These research lines developed the awareness that the best results in the intervention on autistic children can be prosecuted only if it is conducted in a *natural environment*, such as that represented by school or domestic context. The educational intervention must involve all the contexts of student life, and must to be conducted daily and sustained over time (Remington et al., 2007; Whalen, 2009). The ABA perspective present evident points of contact with the approach of *Operant Conditioning* by Skinner. The role of reinforcement is central for ABA perspective, because it provides the identification of most effective reinforcements for each student with ASD, according to his interests and his preferences (Koegel & Koegel, 2006; Remington, 2007; Whalen, 2009). The most used reinforcements in the ABA approach are represented from those social and material (Lovaas, 1987; 1993). While the social reinforcements are commonly represented from clear behaviors of approval, the material reinforcement's results closely related to objects or activities of specific interest for the child (Remington, 2007).

The *Modeling*, widely used in the ABA approach, is a concept connected to Skinner's theory. The Modeling is based on imitative processes provided by the observation of a model's behaviour. In the Modeling, the student is invited to observe and imitate the behavior pattern presented by the teacher, which supplies adequate reinforcements when

the attempts of imitation are successful (Koegel & Koegel, 2006; Whalen, 2009). Another characteristic of ABA perspective is represented from the *naturalness* of the educational intervention (Schreibman & Koegel, 2006; Randolph et al., 2011). The generalization of learning, in particular, is facilitated by the use of reinforcements typical of the child's natural environment (Schreibman & Koegel, 2006). The use of materials that are part of the daily teaching context, like those present in a class, could facilitate the generalizations of the desired behavior in different situations (Koegel & Koegel, 2006). The development of Pivotal Response Training was determined precisely by such considerations. The perspective of *naturalistic teaching* provides from the educational settings play in fact a significant role in the development of this model (Schreibman, 2005; Koegel & Koegel, 2006).

4. The Pivotal Response Training: historical foundations

We can consider like the precursor of the PRT the Discrete Trial Training (DTT, Lovaas, 1987), a model developed for to enhance the learning of adaptive skills in children with ASD. The DTT was one of the first developments of ABA perspective, and was specifically developed for students with ASD associated to low cognitive functioning (Remington, 2007). The DTT is based on the needs of repetitiveness and predictability associated with the cognitive profile of the ASD (Koegel & Koegel, 2006; Randolph et al., 2011; BPS, 2012). In DTT are presents learning modules that must be imitated by the child and properly reinforced by the teacher (Lovaas, 1987; 1993; Bogin, Sullivan, Rogers & Stabel, 2010). The basilar learning sequences of this model are reported in the tab. 2.

Tab. 2. The basilar Learning Sequences of DTT. Adapted from: Bogin, Sullivan, Rogers & Stabel, 2010.

Learning Sequences	Examples of contents
Cognitive	Reading learning; learning to count
Social	To greeting; to say his name; face recognition
Autonomy areas	Learning of personal hygiene routines; use of cutlery

Each sequence of behavior starts with the instruction, which corresponds to the request of the task and represents the *discriminative stimulus*, to signal the type of the request. The answer of the child can be considered as correct or inadequate. If the answer is not performed properly, it is corrected using the teacher's prompts, verbal, gestural or physical (Holding, Kehle & Bray, 2011; Steiner et al., 2013). If the response is adequate it is immediately reinforced with the social or materials reinforcements preferred by the student, such as the approval or the possibilities of playing with his favorite toys. For the adequate acquisition of the correct sequence of learning, it is crucial to have an *immediate reinforcement* of the correct or inadequate response (Bogin, Sullivan, Rogers & Stabel, 2010; Holding, Kehle & Bray, 2011). The DTT is actually considered as one of the most effective methodologies for the early educational intervention in ASD according to the perspective of the Evidence Based Education (Schreibman, 2005; Steiner et al., 2013). It can however be considered as a model, while the PRT is definable like an ecological approach of *second generation* (Bogin, Sullivan, Rogers & Stabel, 2010).

The PRT developed by Koegel is representative for the naturalistic approaches, characterized by a higher adherence to the natural characteristics of the student's living context (Koegel & Koegel, 2006). The second generations models are always derived from the ABA approach, but they differ from those of first generation for differs from belong to this second area. The approaches always represent teaching models based on the ABA perspective, but are characterized by a greater use of reinforcements related to components of the everyday life, and for. The PRT is also characterized by the higher level of personal initiative conferred to child (Schreibman, 2005; Schreibman & Koegel, 2006).

5. The active role of the student in the PRT

The structured approaches of first generation, like the DTT, are effectives for the development of adaptive behaviors, but they have been criticized for the risk of dependence on environmental support offered by the teacher (Schreibman & Koegel, 2006). For this reasons, the use of ecological approaches has gradually become larger because the advantage offered by the progressive inclusion of the teacher in the activities initiated by the child. The ecological approaches of second generation enhance instead the development of the spontaneous initiative of the student (Schreibman & Koegel, 2006;

Smith et al., 2010; Holding, Bray & Kehle, 2011; Steiner et al., 2013; Tyson et al., 2014; Fontani, 2017). This naturalistic evolution of the ABA perspective is represented from the development of the Pivotal Response Training (Koegel & Koegel, 1987; Koegel, 2000; Schreibman & Koegel, 2006). The development of the training was determined by Koegel's observations (Koegel & Koegel, 1987) on educational interventions conducted in more naturalistic contexts than those proposed by the Discrete Trial Training (Koegel & Koegel, 2006). The PRT is based on the selection of the *emergent behaviors* that can to direct towards further learning (Koegel & Koegel, 1987). The emergent behaviors are called *pivotal behaviors*, because they are considered as basic areas on which they can develop other learning (Koegel, Openden, Fredeen & Koegel, 2006). The pivotal areas of greatest importance to the implementation of the PRT are represented by four areas of behavior, summarized in the tab. 3.

Tab. 3. Pivotal Areas of the PRT. Adapted from: Koegel & Koegel, 2006.

Responding to multiple cues and stimuli;
 Increasing spontaneous initiative;
 Improving the motivation;
 Increasing the skills of self-regulation.

The first area refers to *response to multiple stimuli*: the student must be oriented towards the sensitization to multiple features of stimuli for to compensate the typical *overselectivity* on irrelevant aspects of the stimulation (Lovaas, 1993). The second area concerns instead the need of development of the child's *spontaneous initiative*. In this pivotal area the student, is invited to develop ways to express his needs and to request information on the environment. The pivotal area of *improving of the motivation* is crucial, because the lack of motivation is responsible for the lack of development of adaptive behaviors (Koegel, Koegel & Carter, 1999; Koegel, Openden, Fredeen & Koegel, 2006). The development of the motivation is fostered by the possibility of independent choice of materials and themes during the learning session. The use of natural reinforcements, such as the objects and the student's favorite activities, allows the development of motivation to

the task. This area is characterized by immediate reinforcement of all attempts aimed at achieving the objective. The maintaining of the motivation is closely related to the provision of adequate reinforcements (Koegel, Openden, Fredeen & Koegel, 2006).

The pivotal area for the compensation of the deficit of *self-regulationskills* is another crucial area in the PRT. This deficit is responsible of many maladaptive behaviors, which may impede the adaptation to the environment (Koegel & Koegel, 2006). The student must to develop the awareness on his inappropriate behavior, as well as his capacity of *self-monitoring*, essential for the management of maladaptive behaviors typical of the profile commonly associated to ASD (Schreibman & Koegel, 2006). The constant reference, during the intervention, to these pivotal areas, can give more space to the student's personal initiative during the interaction with the teacher or with his peers.

The naturalistic approach enables to teach the adaptive behavior in the environment in which they are usually developed. The opportunities presented by the natural and spontaneous behavior can be used for learning through their immediate reinforcement. The teacher, for example, could reinforce in a massive way the child's choice of a theme or an activity (Koegel, Openden, Fredeen & Koegel, 2006). When the child has started the selected activity, the teacher can gradually join in the activity, imitating the child's behavior. Through this way, the teacher can offer experiences of *sharing attention*. Deficits in these processes are typical in the ASD, and this aspect is probably responsible for the deficit in social communication (Whalen, 2009). The PRT explicitly provides the use of naturalistic materials as reinforcement like those available in the school context. The sharing reading of a picture book together with the child, the vision a of a movie, the exchange of symbols of Augmentative Alternative Communication they are all examples of sharing activities between teacher and student with ASD.

In the naturalistic approach like the PRT, the task is chosen by the child according to his preferences, while in the approaches of structured teaching of the first generation, like the DTT, the task was imposed by the teacher. For these reasons, the PRT is based on the concept of *gratification intrinsic to the performance of the task* (Koegel & Koegel, 2006; Steiner, et al., 2013). Similarly, the ability to perform behaviors central to the development of entire areas of behavioral repertoires, is illustrate from the concept of Pivotal Behavior. It defines the prototypical behavior for the development of other areas of behavioral

repertoires. The sequence of actions needed for hand washing, for example, could represent a pivotal behavior for learning other areas of personal hygiene. The use of the pivotal areas would allow simultaneous learning in other similar behaviors (Koegel et al., 2006). The teaching conducted in the context of the student's natural life, like that represented by the classroom, could encourage the spontaneous production of behaviors that belong to the same category (Schreibman, 2005; Koegel & Koegel, 2006; Steiner et al., 2013).

This active role of the student is likely one of main factors responsible of the high levels of effectiveness for the educational interventions in the ASD. This data is confirmed by the recent analysis of randomized studies on the results of implementation of the PRT (Randolph et al., 2011; Genc & Vuhran, 2013). The results of the studies confirmed the effectiveness of the PRT for the generalization of the learned competences and for the reduction of maladaptive behaviors (Schreibman, 2005; Koegel et al., 2006; Randolph et al., 2011; Genc & Vuhran, 2013).

6. Educational implications related to PRT

The gratification implicit to the communicative context and the interactive features of the PRT appears as particularly appropriate for students with low cognitive functioning associated with deficit of self-regulation, and particularly for the child in the age range of the Primary School. We must also consider the possibility of teaching the guidelines of training to the student's family members, who can be thus involved in the intervention for the generalization of learned skills also in the domestic context (Coolican, Smith & Bryson, 2010).

The multicontextual intervention in the various domains of life is considered crucial for any educational intervention modeled based on educational special needs commonly associated with the ASD profile, as confirmed by the most recent developments in the ABA perspective (Anagnostou et al., 2014; Tyson et al., 2014). The implementation of the PRT allows the transformation of the student's favorite activities in opportunities of learning, which can provide the basis for further learning, (Koegel et al., 2006). The opportunities provided by the model in the promotion of the motivation are evident, because the

experiences conducted stimulates the emergent behaviors, which reflect the interests and preferences of the child.

Despite the higher effectiveness levels, not all the students with ASD are ideal candidates for training. Children who respond best to the educational implementation of the PRT are those that are clearly interested in the objects or toys, and which are able to tolerate a possible contact with the teacher (Koegel & Koegel, 2006; Koegel et al., 2006). The students with massive presence of stereotyped and repetitive behaviors and those of significant deficit in verbal communication, instead, do not respond to training optimally, (Koegel et al., 2006; Nefdt et al., 2010). These considerations, derived from randomized studies on single cases, should orient towards a preliminary selection of the students candidate for a possible implementation of the PRT (Randolph et al., 2011; Genc & Vuhran, 2013; Tyson et al., 2014)

A preliminary training to improve the communicative competences could represent a possible sensitization mode for the students with behavioral profiles characterized by verbal deficit and repetitive behaviors (Koegel & Koegel, 2006; Koegel et al., 2006; Nefdt et al., 2010; Tyson et al., 2014). An effective preliminary training for the PRT it could be founded on the communicative exchanges of symbols derived from PECS (*Picture Exchange Communication System*, Bondy & Frost, 2002). The PECS training could promote the development of communication skills and facilitate the reduction of stereotypies, given the decreasing of maladaptive behaviors associated with the development of communicative skills (Bondy & Frost, 2002; Koegel & Koegel, 2006; Koegel et al., 2006).

Further educative implications for the preliminary training are derivable from the use of *Augmentative and Alternative Communication Systems- AAC* (Beukelman & Mirenda, 2013). The development of communication skills, based on the symbolic codes of the AAC, may similarly have a positive effect on the decreasing of repetitive behaviors and on the development of verbal skills. These skills, in turn, can constitute a background for the implementation of the PRT (Koegel & Koegel, 2006; Mirenda & Iacono, 2009).

Conclusive remarks

The considerations on the effectiveness of the PRT training for the learning of the basic behaviors and for the development of autonomy skills could induce reflections on the

opportunity of including him in the educational relationship oriented towards the response to special needs of the student with ASD (Whalen, 2009; Steiner et al., 2013; Tyson et al., 2014). Similar considerations can be expressed in relation to training for the teachers. The inclusion of guidelines of the PRT in the course of study for the Special Support Teacher, in this perspective, could represent an opportunity for the implementation in the educational context of an effective and validated model, specifically designed for the student with ASD.

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