EVIDENCE-BASED INTERVENTION FOR AUTISTIC CHILDREN: PIVOTAL RESPONSE TREATMENT

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ABSTRACT

Autism is a neurodevelopmental disorder which affects an increasing number of children. Either due to global awareness of this condition or to the changing of diagnostic criteria, or to a real increase in incidence among children, the prevalence of autism reported worldwide is growing, reaching 1 in 68 children in 2012, in the USA. At the same time, the need of effective, flexible, scientifically validated interventions that are accessible anywhere in the world is becoming imperative. In recent years, many intervention strategies have been devised, aiming at certain specific development areas (e.g. language development) or an integrated development in several areas. Pivotal Response Treatment (PRT) was developed as a therapeutically effective, accessible intervention strategy, whose scientific validation attests the efficiency in improving communication and functional language skills, social contact initiation, management of unwanted behaviors, answer to multiple requests, symbolic and adequate play.

Keywords: autism, pivotal response treatment, pivotal areas, parental intervention.

INTRODUCTION

Autism is a neurodevelopmental disorder which affects an increasing number of children. In Europe, an average of the prevalence reported after 1999 has reached 18.75/10000 children. [1] In the US, the CDC reported that one out of 68 children was diagnosed with autism, in 2012.[2] Either this increase is due to a real growth in incidence among children, or to an increased global awareness, an understanding of the specific traits and/or changing the diagnostic criteria [3], the need for effective therapeutic models, that are accessible and scientifically validated is growing.

In recent years, many intervention strategies have been devised, aiming at certain specific developmental areas (e.g. language development) or an integrated development in several areas, especially those considered problematic for this condition. the harmonious and emphatic family relationship [1].

Most of them are more effective than the education strategies in the special needs or standard schools, but the evidence is still not clear enough or the research done so far is not conclusive enough. [4]

Pivotal Response Treatment stands out through its solid scientific validation, both in respect to the overall interventions, as well as its strategies for particular therapeutic areas (e.g. learning symbolic play or self-management). In a 2014 systematic review, it is shown that 15.4% of the studies conducted report conclusive, clear results on improving communication and language and play...
skills, with 28.2% reporting results inclining towards an improvement in communication and language skills. [5]

**WHAT IS PRT?**

Pivotal Response Treatment is a therapeutic intervention used both in Applied Behavioral Analysis (ABA) procedures, as well as in procedures specific to developmental therapies. It was initially developed in order to improve verbal communication in autistic children and it was called the “Natural Language Teaching Paradigm”. [6] Afterwards, it adopted effective strategies and procedures from other behavioral programs such as incidental learning, mand-model, Prelinguistic Milieu Teaching and Early Start Denver Model and became one of the 10 comprehensive program models for autistic children identified by the National Research Council [7]

The goals of this therapeutic approach are: 1. To teach the child to respond to several learning and social interaction opportunities that come along in his/her natural environment; 2. To decrease the need for supervision by a therapeutic services provider and 3. To decrease the number of services that remove the child from his/her natural environment. [8] That is why PRT focuses on intervention on pivotal areas, defined as those areas the change of which can produce positive collateral effects on other developmental directions. Thus several pivotal areas have been identified on which this approach intervenes and develops learning and response strategies: motivation, response to multiple requests, self-management and self-initiations. [9]

**MOTIVATION**

The lack of motivation in answering social stimuli is considered the main cause of cognitive, social and communication deficits for autistic children. That is why PRT sees it as maybe the most important pivotal area and focuses on developing it as if it were the target-behavior. Research indicates that once this characteristic improves, all the other developmental areas benefit from positive effects and improvements, increasing the child’s learning capacity. [10]

In the context of naturalistic therapeutic approaches, of which PRT is part, motivation is defined by noticeable characteristics of response to stimuli. The child is motivated when the response latency is lower, the number of responses to stimuli increases and there is a positive affective disposition during lessons, as the child shows interest, enthusiasm or joy. [11] In lack of a sufficient motivation of the child, one can notice task avoidance behaviors, increased response latency, self-stimulation and even aggressive of self-aggressive behaviors, tantrums or destruction of surrounding objects. [12]

Increasing motivation to respond to stimuli was successfully used in interventions to improve social relationships, functional language and academic performance in autistic children [13], being also effective in reducing inadequate or disruptive behaviors. The ways in which it aims to increase motivation are: child choice, interspersal of tasks, combining maintenance tasks with new ones, positive reinforcements, using natural and direct reinforcements. [14]

**CHILD CHOICE**

This refers to using toys, activities, conversation topics or games that the child likes and approaching the therapeutic intervention techniques in order to learn new skills through and around them. Preferred activities are a strong natural motivator, so that the learning process is easier to accept, the Romanian Journal of Child and Adolescent Psychiatry
child is more attentive and task avoidance behaviors are avoided. Choices during the learning process are countless. The child can be asked what he/she wants to write with or where he/she would like to sit or which color he/she would like to use. Also, the child can pick the following activity (What would you like to do, write or read?). Or even the therapist or child can take turns in choosing the following task or activity, the therapist choosing one that is not a favorite but that needs to be done (e.g. writing), while the child will of course choose something he/she likes (e.g. painting). [15] Child choice can also be effectively used in developing language and communication, by introducing new words, sentences or syntax and morphology concepts using the child’s preferred topic of discussion (e.g. dinosaurs) [16].

Interspersal of maintenance task and task variation. Since the 1980s, research has shown the advantages of diversifying the tasks presented in a learning session. Traditionally, in a learning session one task is presented and repeated several times in order to ensure learning. Dunlap and Koegel have repeatedly shown, in studies conducted on autistic children, that diversification of new tasks in a learning session is more effective in learning the taught skills and concepts. [17] Moreover, if previously learned tasks are interspersed among the new learning tasks, efficiency of the learning is even greater and there is also a positive effect during learning sessions. [18]. The interspersal of new and mastered tasks within the same learning session is effective as the student receives reinforcements for a series of specific stimuli, which we can categorize as “class instructions” and will then have the same attitude towards the next task, which despite being new and more difficult, is included in the same category of stimuli, for which he was previously rewarded. [19] Some researchers attribute the effectiveness of this strategy on the large number of rewards which the student receives during a learning session, for the maintenance tasks, but Charlop et al. show that the high number of rewards can actually decrease the effectiveness of the intervention [20].

**REINFORCEMENT OF REASONABLE ATTEMPTS.**

During the learning process, often the autistic child has difficulties is doing a task for objective reasons, given the motor, memory, pronunciation deficits and others. Moreover, the lack of motivation to respond to tasks is well-known. This is why rewarding the reasonable attempts to accomplish the tasks, even in the case of better priors, motivates the child to keep on trying in the following sessions and decreases the frustration that he/she cannot fulfil the task. [21]

Direct and natural reinforcement. Traditionally, rewarding a task accomplished by the child is conducted with an item preferred by the child, especially because it motivates the child in any situation and is not connected to the actual task. Food rewards for example are used to learn categories, say words or make a puzzle. The PRT strategy, based on previous scientific studies, conducted in the early 80s, is to offer rewards that are strictly tied to the task or to have a reward that is a natural consequence of fulfilling the task. For example, offering a ball as a reward after he pronounced “ball” correctly is much more natural than offering a cookie. Furthermore, the child understands the natural and functional consequence of language, increasing the generalization of the concepts learned. The reward can also be embedded in the task; for example, instead of
receiving a toy for opening a box, a relation not clear to the child, the toy is inserted in the box and upon completing the task, the child directly receives the reward. [22]

Each of these strategies are meant to increase autistic children’s motivation to answer to stimuli and they have been shown to be effective and have been included in many comprehensive therapy approaches for children with learning difficulties. However, combining several such strategies leads to an even stronger motivation for children and to better results in respect to learning effectiveness, as is the case of the PRT approach. A 2010 study wanted to see whether the combined motivational techniques for autistic children can improve children’s behavior and learning efficacy in academic tasks. [23] Academic tasks are maybe among the greatest challenges for autistic children, as most of the time they are completely uninterested in them. Combining child choice, interspersal of maintenance tasks and natural reinforcers, the study measured the increase in academic performance (writing and mathematical operations) in 4 children with ages between 4 and 7, diagnosed with autism. For writing, children were allowed to choose the writing instrument, the place where they wanted to sit for the duration of the task and were then asked to write something about their favorite activity and rewarded with an activity related to their writing. For example, a child was asked to write something about the playground and the reward was actually access to the playground. For mathematical operations, children were able to choose writing instruments, the place where they wanted to write and either jellies or game parts were used in order to conduct those operations, both the jellies and the parts later being used as rewards. After this intervention, all children improved their academic performance, assessed through the number of letters written per minute and the number of mathematical operations per child. Also, the response latency to tasks dropped from 5-10 minute intervals to intervals between several seconds and just under one minute, for all children. Moreover, the appearance of disruptive behaviors brought about by task presentation even dropped to 0% in certain cases. Calculating Cohen’s effect size, a score higher than 0.8 was obtained for all children; this is a large effect size, which shows yet again the effectiveness of the intervention.

RESPONSE TO MULTIPLE REQUESTS

The autistic child’s over-selective attention has been in the researchers’ spotlight for some time now, being considered the cause of the incapacity to define objects through a generally accepted trait as being essential or in answering several consecutive or simultaneous requests. Over-selectivity is an atypical limitation of the number of stimuli or characteristics of a stimulus of the learning process, resulting in a reduced or restricted control of that stimulus. [24] This limitation has a negative influence on social behavior, generalization of learned concepts, use of functional language and capacity to learn directly from the external environment.

In order to reduce over-selective attention and the limited response to the characteristics of a stimulus in the case of autistic children, a strategy was developed in order to teach them how to answer multiple requests. Two approaches are used:

1. exaggerating the main characteristic that we want, to the detriment of other secondary characteristic according to which the child would characterize an object/situation and its gradual reduction after acquiring the information. This method is used in order to stress that defining feature for that stimulus which the child does not usually notice. For example, when the child learns
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the letters “p” and “b”, he/she often mistakes them and so the line is exaggerated to the detriment of other features until the child is able to discriminate them.

2. direct learning using conditioned discrimination, by asking the child to differentiate among 2, 3 or more characteristics of an object (“Bring me the blue square”, if in the learning room there are several geometric shapes of several colors). Expanding this technique in the surrounding environment, which provides more learning opportunities, the child can generalize this capacity to discriminate and can use it in other development areas (language, social behavior etc.). Also, a response to multiple requests is also the capacity to analyze and accomplish several consecutive requests from the same category (“Color the circle in blue, the square in green and the diamond in red”).

SELF INITIATION

Until now, social deficits were considered an important diagnostic criterion for autism, alongside verbal communication and stereotypies, in DSM IV. Bearing in mind, however, the tight connection between communication and social interactions, in DSM V the diagnostic criteria are reduced to two, deficits in social communication and restricted patterns of behavior. [25]

Social communication deficits in autistic children can be manifested in several ways, from a lack of visual contact, joint attention, to avoiding social relations and the incapacity to initiate social communication, not even at a minimum level. This developmental area is seen as a pivotal area which conditions the other behavioral areas (functional language, academic performance etc.). PRT has developed several teaching strategies for autistic children for the initiation of social communication, combining other therapeutic strategies, like child choice, natural and direct reinforcement (receiving a reward being a social interaction), interspersal of maintenance tasks and reinforcement of reasonable attempts.

One of these strategies is direct teaching, so that the child asks questions such as “Where?”, “When?”, “How?”, “why?” (asking wh- questions). Thus, children not only have skills to ask questions, but also have generalized these behaviors, have initiated other questions which were not taught directly, and positive effects on social behaviors have also been noticed.[26, 27]

Another way to increase levels of child-initiated social behavior is the inclusion of social interactions as part of the reward for fulfilling the task. For example, as a result of pronouncing the word “jump”, the child will have access to a trampoline to jump but during an intervention which focused on using embedded social interactions, with the therapist jumping in the trampoline together with the child. Or, as a result of pronouncing the word “sing”, the child will not only have access to the video recording of the favorite song but the therapist actually sings it. Such an intervention results in an increased level of social interactions initiated by the child during the functional language learning sessions, a positive affect during communication and in improved social communication [28]

Autistic children’s difficulties in socializing with peers have been targeted by a series of studies and specific interventions were devised in order to improve social interactions with them. One of the ways was to build social relations with peers based on particular interests and favorite activities of children and adolescents with autism or Asperger’s syndrome. As a result of interventions at school, both autistic people and their peers had a significant
increase in social contacts and communication. [29, 30]

The interest for this pivotal area and its importance in the child’s entire behavioral development has determined researchers to focus on early interventions, trying to investigate whether these techniques of improving social interactions also work at very small ages. Thus, modified PRT interventions were applied in 3, 4, 7 and 9 month old children displaying signs of a dysfunction in social behavior, according to their biological age. At the end of the intervention, all children showed improvements in social behavior, quantified by an affective state during social interactions, visual contact and response to name. The intervention was based on children’s complex motivation in answering social stimuli and generated stable social behaviors which remained stable after the end of the intervention. [31]

SELF MANAGEMENT

Self-management is a strategy developed in order to reduce the constant need for parental supervision of the child with autism and to increase independence. However, it can be used in multiple behavioral areas, being considered a pivotal area. It can be used as a technique to decrease stereotypies, to control unwanted social behaviors or to improve social communication during a conversation. Practically, the self-management strategies can be adapted to a multitude of activities or behaviors which entail the control of one’s own behavior and were successfully applied in children, adolescents or adults with autism or other disabilities.

One of the most often encountered uses of the self-management strategy in children or adults with autism is that of reducing or eliminating stereotypies. Stereotypies, one of the major diagnostic criteria for autism, are a behavior that creates many difficulties to autistic people, as a result of their interference with learning and attentions processes, social integration, academic performance and the possibility of attending school. With time, several methods of intervention were used to reduce repetitive behavior: NCR (noncontingent access to items that compete with stereotypy), DRA (differential reinforcement of alternative behavior), DRO (differential reinforcement of other behavior), decreasing the sensory impulse produced by stereotypies, overcorrection, response blocking, delayed reinforcement, time-out, physical exercise etc. [32] However, PRT has adopted a simple, non-invasive, highly effective strategy that is based on differential reinforcement and on teaching the child how to identify stereotypical behaviors, how to monitor and gradually reduce them. By self-recording the time intervals in which the stereotypical behavior was absent, with the help of a timer, and offering rewards for accurate recording, such behaviors were reduced, even in children with severe autism, mental retardation and intense stereotypical behaviors throughout the day [33]. The two strengths of this intervention are: the possibility of being used for extensive periods of time without a therapist, because the person self-records, and the possibility of adapting this strategy to a variety of conditions and behaviors.

Another method of self-management behavioral intervention is used in teaching adequate play. The child is taught how to identify inadequate behaviors with toys and with the help of a timer he records the period of adequate play. At intervals pre-established with the child, he gets a reward for an adequate play. If he plays inadequately with a toy, the therapist takes the toy away and limits the child’s access to it, resets the program and the child can ask for another toy. As a result of this intervention, children learn adequate behaviors without
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generalization, being displayed by children only when timed. [34]

Self-management techniques were also used in order to teach children how to initiate questions about a topic discussed with a partner [35], to communicate effectively in a conversation [36] or even to say the first word in the case of certain nonverbal children. [37]

Moreover, PRT focuses on teaching in a way as natural as possible, which is why it is applied in the child’s natural environment (home, kindergarten, school) and involves the parents a lot in implementing the therapeutic techniques. Recent research shows the fact that using a naturalistic teaching paradigm leads to an improved clinical state of the child with autism and autism-related conditions. Moreover, positive collateral effects were also seen in the family, through an improved parent-child relation, in increased positive social interactions [38] and in an improved quality of life [39]. The methods of parental learning about the therapeutic techniques vary from direct learning [40] to self-directed learning [41] and they have proved to be viable methods, with positive results on the child’s education, but also on parents’ behavior, as they appeared much more confident in the relation with the child. Self-directed learning was conducted via video recordings and followed certain essential aspects in educating and evaluating parents and their therapeutic interventions: the correct use of procedures, creating learning opportunities, child choice, reinforcing behavior immediately after the child’s attempt to use functional language and natural reinforcers. Such therapeutic ways of intervention mediated by parents can be very useful in early interventions, until authorities can make available an authorized service, where such services are not available, in the rural areas or in countries where these services are not free of charge or where there are great distances to a service provider.

CONCLUSIONS

PRT is a therapeutic approach scientifically validated through research and randomized control trials which has repeatedly shown effectiveness in the therapy of autistic children, in increasing communication and functional language skills, in initiation of social contacts, management of unwanted behaviors, response to multiple requests, symbolic and adequate play. Moreover, due to parents’ involvement in the therapy it improves not only the child’s life but also family life, hence offering the child therapeutic intervention at young ages, where it would not be possible otherwise, with a lack of qualified staff, in rural areas or without constant financial support.

Pivotal Response Treatment is a naturalistic intervention, not very costly, conducted in the family environment which is familiar to the child. It has effective strategies that can be easily adapted to many situations and many developmental areas, which is why it is seen as an evidence-based intervention which can lead autistic children to their Optimal Outcome. [42]

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