Cognitive treatment for children with attention deficit hyperactivity disorder (ADHD). Review and new contributions

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ABSTRACT

This study reviews cognitive programmes applied to children with attention deficit hyperactivity disorder (ADHD). It carries out an in-depth analysis of the programmes that include self-regulation training, their efficiency, the most suitable conditions for their application and the effect produced by their combination with other cognitive and behavioural techniques. Finally, this study explains the clinical results derived from the application of a self-regulation scheme adapted from Meichenbaum’s Self-Instructional Training Programme (Orjales, 1991), the application of this scheme with new self regulations, and the use of such scheme for the selection and sequencing of training tasks.

Key words: Attention deficit, hyperactivity, self-regulation, cognitive treatment, verbal mediation

INTRODUCTION

The so-called attention deficit hyperactivity disorder (ADHD) has given rise to great controversy among clinicians coming from different theoretical approaches and an overwhelming interest in its research in the areas of psychology, medicine and education. Even though the generalised awareness of ADHD in Spain could be centred around the year 1995, the first descriptions of similar cases appear at the end of the nineteenth century and in spite of the fact that we are currently offered a reconceptualisation of ADHD as a disorder of executive control (Barkley, 1997), back in 1892 Tuke defined hyperactivity as a symptom of impulse disorders and Clouston discussed states of impaired inhibition associated with excessive activity. Ever since that time, various terms have been coined to describe this type of child (for an in-depth historical review see García-Villamisar and Polaino-Lorente, 1997, and Cabanyes and Polaino-Lorente, 1997), and the diagnostic criteria have gone through several modifications (see Moreno and Polaino-Lorente, 1997). Nowadays, the last review by DSM-IV (APA, 2000) includes ADHD within the section entitled “Attention Deficit and Disruptive Behaviour Disorders”, so sharing a typology with three more disorders, namely, Oppositional Defiant Disorder, Disocial Disorder and Unspecified Disruptive Behaviour Disorder. Subjects with ADHD must meet at least six out of the nine symptoms of inattention (predominant inattentive subtype), six of the nine symptoms of hyperactivity or impulsivity (predominant hyperactive-impulsive subtype), or six of both groups of symptoms (combined subtype). Furthermore, the symptomatology needs to be observed in two or more environments; some symptoms need to have appeared or caused alterations before age 7; there must be clear evidence of clinical significant deterioration of social, academic or work activity and the symptoms can neither exclusively appear during the course of pervasive developmental disorder, schizophrenia, or any other psychotic disorder, nor be better explained by the existence of another mental disorder (e.g. mood disorder, anxiety disorder, dissociative disorder) or a personality disorder.

This is the framework in which we are moving today, although everything points to it not being long before the next edition of this manual appears and this will bring about significant changes. At this moment in time, however, there is some agreement among the majority of researchers about the undeniable biological origin of the disorder, associated to some disfunction related to the frontal lobe (Swanson et al., 1998; Leo and Cohen, 2003; Faraone and Biederman, 1998; Castellanos and Acosta, 2004; Etchepareborda and col., 2004; Narbona-García and Sánchez-
Carpintero, 1999; Capdevila-Brophy and col., 2005). Some neuro-psychopathological studies (Barkley, 1977) seem to suggest malfunction of the prefrontal cortex, which intervenes in the individual’s activation of behaviour, in resistance to distraction, and in the development of time awareness; malfunction of the caudate nucleus and of the globus pallidus, which favours the inhibition of automatic responses and facilitates reflexion; and malfunction of the cerebellar vermis, probably associated to the regulation of motivation.

As regards the hypotheses about the origin of this disorder, genetic hypotheses have taken on special strength since the late nineties. The interest in finding a genetic marker for ADHD has brought about a powerful trend in research (Goodman and Estevenson, 1989; Guilli et al., 1992; Barkley, 1990; Cook, 1995; Swanson and col., 1998) which occasionally seems to forget or ignore the real importance of educational and environmental factors in the modulation of the symptomatological expression of the disorder.

In the last few years, research is being carried out on the greater frequency of a variant of the DRD4 gene (Lahoste, Brook and Marshall, 2000) and of the DRD5 gene (Kustanovich, 2004). The studies point to the existence of some defective genes which might be in charge of dictating to the brain on how to use the f dopamine, a brain transmitter which inhibits or modulates neurone activity, specifically the activity of those neurones which take a part in the control of emotions and movement. However, in spite of the effort made by clinicians and researchers, the fact is that the diagnosis of ADHD is currently limited to the clinicians’ ability to analyse the behaviour and the medical histories of the subjects, since there are not any biological markers available which speed up and optimise a good differential diagnosis and shed more light on the existence of different subtypes and high comorbility with other disorders.

The diagnosis of ADHD thus requires, a multidisciplinar approach, a very deep knowledge about the patients, about the evolution of the symptoms throughout their lives, about their family antecedents, about their specific situation and about the level of misadaptation shown, always assessed on the basis of the environmental requirements and the supports available at each moment of their lives.

At the end of the nineteen eighties, Dr. Barkey, director of the Psychology Ward in the Clinical Hospital of the University of Massachusetts, proposed an explanatory approach that accounts for ADHD and entails the reconceptualisation of the traditional symptoms of inattention and impulsiveness and proposes that the behaviour of children with ADHD show two types of deficits. One of them is the inability to generate behaviour governed by rules (rule governed behaviour), when the objectives and consequences of behaviour depend on verbal stimuli and are not present in the environment. The other type of deficit is the abnormal response to the consequences of the environment, that is to say, lesser reaction to reinforcing stimuli, unusually rapid effect of feeling fulfilled by or getting used to some stimuli, and a deficit in the response to reinforcement programmes (Servera-Barceló, 2005). With the passage of time and on the basis of previous approaches, Barkley shapes a comprehensive approach called Hybrid Model of Executive Function (Barkley, 1997).

Even though such a model does not reflect in itself the importance of the environment as a modulator in the symptomatological expression of the disorder and focuses only on trying to account for the neurological and psycho-pathological factors that may be taking place in the environment, it provides valuable information for a better understanding of ADHD (Orjales, 2000a and 2000b). In his book ADHD and The Nature of Self-control, Barkley regards ADHD as a disorder in the development of behavioural inhibition, and understands self-control or self-regulation as the individual’s ability to stop the first response which was initiated after the appearance of a given stimulus, and as a way to protect his thinking from external or internal distraction and to elaborate a new and more suitable response which could substitute the first response (Barkley, 1997). During these moments when the response gets delayed, the executive functions are put into action. They are defined by this author as all those self-addressed mental activities which help the individual to withstand the distraction, to set up new more suitable aims than the initial inhibited response and to follow the steps necessary to meet such aims. Subjects with ADHD would have difficulty in carrying out the following processes: (1) inhibiting immediate responses to a given stimulus or event, (2) interrupting the response activated after a command or after feedback for their mistakes (error awareness) and (3) protecting such latent time and the self-regulation time period (executive control) from sources of interference (interference control or resistance to distraction).

For this author there are four executive functions with a neuro-physiological correlation which are altered in children with ADHD. (1) The action of memory of work (or memory of non-verbal work), which makes it possible to retain information in order to use it when the stimulus that originated it disappears. This fact would affect the retrospective perception of subjects with ADHD, their awareness and control of time, and their ability to imitate a new and complex behaviour after observing other people. (2) The self-addressed or covert speech (or memory of verbal work), which permits in an autonomous way, the regulation of behaviour, to follow rules and directions, to wonder about how to solve a problem and to build up ‘meta-rules’. This would bring the subject with ADHD greater difficulty in regulating their own behaviour and making them responsible for their limited self-control and self-questioning. (3) The control of motivation, emotions, and states of alertness, which, according to this author, would account for the tendency of subjects with ADHD to show all their emotions, their inability to censure them with the maturity expected in people of the same age and their difficulty to self-regulate impulses, motivation and emotions. (4) The reconstitution process, which, for its part, consists of two sub-processes, namely, the fragmentation of the
behaviours observed and the recombination of their parts in order to design new actions. The subjects with ADHD would lack the cognitive flexibility necessary to analyse learned behaviour and to use it in order to synthesise other behaviour, so their problem solving ability is limited.

In this framework, the executive functions represent therefore, the internalisation of behaviour as a way of anticipating a change in the environment, which supposes the internalisation of time awareness as regards the ability to anticipate sequences of change in the environment (Barkley, 1997).

**INTERNALISED SPEECH**

Internalised behaviour, which depends on internalised speech, is widely studied in developmental psychology (Diaz and Berk, 1992). In this sense, Laura E. Berk proved that internalised self-talk, which usually takes place gradually and is completed by age 10, gets delayed in children with ADHD (Berk, 1992). One decade earlier, Copeland had used a unidirectional mirror to observe that hyperactive children spoke more loudly when they were playing by themselves, expressed more immature self-talk and showed worse planning abilities when facing a hard problem-solving task, during which they uttered a greater number of exclamations and descriptions about themselves than about the strategies to use (Copeland, 1979). The literature seems to regard this fact as a reflection of the lack of maturity associated with ADHD and, in spite that I share this argument firmly, I also believe in the need to point out that externalised speech in subjects with ADHD may constitute a necessary adaptation measure, just as Barkley understands that executive functions working as self-addressed functions do not need to be concealed in order to be considered functions of an executive nature or an example of self-regulation. For this reason, as regards both evaluation and design of intervention programmes, we should bear in mind not only the child’s age and the existence of open or externalised verbalisations, but the actual types of verbalisations and especially, whether or not, they meet an executive function.

Clinicians frequently observe that children with ADHD verbalise the emotions aroused by the task to carry out, to a greater extent, than they verbalise the strategies addressed to the successful fulfilment of the task, such as verbalisations to reorient their attention and keep centred on the objective, to plan their actions, to select relevant information, to keep the information in their work memory, or to evaluate their process or their results. However, we also observe externalised adaptive speech of high executive standard in older children or in cognitively trained children, which is, firstly, a product of need and secondly, the result of the need and the conscious awareness of its usefulness as a regulation measure.

In the light of the above remarks, it seems logical to think that achieving private or covert talk in children with ADHD should be a secondary objective in intervention programmes, the first objective being to organise overt talk for the sake of greater operating capacity. The therapist will be able to take advantage of the natural tendency of hyperactive children to externalise emotions and thoughts in order to analyse their executive operation and, more importantly, in order to restructure their behaviour. In this sense, we analyse the evolution of the intervention programmes which have aimed, first, at reducing impulsive behaviour and, second, at modifying impulsive information processing.

**EVOLUTION OF COGNITIVE PROGRAMMES FOR ADHD**

From the perspective of Barkley’s model (1997) we now recover the intervention programmes derived from the peak of 1985-1995 studies on impulsiveness, which sought in the first instance the external control of behaviour and progressively moved on to the development of self-control strategies. Among the first attempts are programmes based on (Orjales and Polaino-Lorente, 1997): (1) Imposed delay, which consisted basically in making the child delay his response a few minutes before allowing him to respond, and which managed to reduce the latency of the children’s response without a real improvement in performance. (2) The modelling of reflective behaviour strategies, whose success depended on the use of live or video-recorded adult or child models. The best results were achieved when peers were used, which in addition to reflexive methods, reflected exploration strategies. (3) Training based on providing the child with feedback from their errors, which was useful in showing that impulsive children did not modify their latency on the basis of their error feedback. (4) Training in exploration and registration techniques, which manage to reduce errors even in the absence of latency reduction.

Within this framework and with the aim of increasing performance and supporting self-control, Palkes et al. were the first to use self-addressed verbal commands in children with ADHD (Palkes, Stewart and Khana, 1968; Palkes, Stewart and Freedman, 1972). They wrote the verbal instructions, “Stop, look, listen and think” on posters for a two-session training programme in which such instructions were a support in carrying out motor-perceptive and visual discrimination tasks. The results revealed increase of latency but no significant improvement in the performance of a Porteus Labyrinth task. These results, which were similar to the results of imposed delay tasks, were found logical given the fact that these instructions were but a self-imposed delay type. These techniques were ineffective on their own, because children with ADHD do not manifest only a problem with inhibition of immediate responses to a stimulus or task and scarce resistance to distraction, but also alteration in the processes of perception and analysis of information, together with difficulty when elaborating and organising the response (Orjales, 1991).

**MEICHENBAUM’S COGNITIVE SELF-INSTRUCTIONAL MEDIATION PROGRAMME**

In the year 1971, on the basis of Jensen’s (1966) definition of verbal mediation, Meichenbaum
formulated the hypothesis that, due to their impulsiveness, hyperactive children do not analyse experience in terms of cognitive mediation or internalise rules that may work as guidelines for new learning situations. Given the theory of social learning and the Soviet developmental theories, and as a continuation of the work by Palkes and her team, Meichenbaum and Goodman (1971) developed the cognitive self-instructional mediational training. This training programme consisted of the combination of two types of modelling, namely overt and covert, and incorporated some modifications to former treatments: it first included the use of self-instructions which intended to interrupt the string of inadequate thoughts that the impulsive child elaborated some moments before solving a problem (prepotent responses) in order to apply their learning of these self-instructions and substitute them for a sequence of thoughts useful for solving problems. Meichenbaum (1974) even describes these self-instructions as a type of cognitive prosthesis which can be used to facilitate behaviour modification.

Self-instructional training was designed to be carried out in five phases which show the attempt to move from measures of external control of behaviour to measures of internal control, or self-control measures: (1) Cognitive modelling: the therapist models the instructions aloud; the child listens and looks. (2) External guide: the child carries out the same task by following the therapist’s directions, by verbalising the self-instructions. (3) Manifest self-guide: the child carries out the task verbalising aloud and to himself the self-instructions. (4) Manifest attenuated self-guide: the child works by whispering the self-instructions to himself. (5) Covert self-instructions: the child uses his internal language to guide his performance in silence.

As for the type of tasks used for self-instructional training, the tests ranged from simple sensory-motor abilities to abilities to solve more complex problems. Copying and reproducing design tasks; following sequences of instructions, taken from the Stanford-Binet intelligence test; tasks such as completing a series of drawings, e.g. The Primary Mental Abilities Test and tests such as Raven’s matrices, were used. In each case the therapist modelled the most adequate self-instructions for each type of task (Meichenbaum, 1971). Around the same time other studies started to apply self-instructional training programmes which included the modelling of various strategies. For example, Douglas, Parry, Marton and Garson (1976) trained children to use the following verbalisations: (1) I need to stop and think before starting out. (2) Which plans (strategies) can I try? (3) How should I work if I do it this way? (4) What shall I try next time? (5) Have I done well so far? (6) Look, I made a mistake here; I have just corrected it. (7) Now let’s see, have I tried all I could have? And (8) I’ve done a good job.

Meichenbaum found a common factor in the studies which included training in verbalising aloud. All of them focus their objective on teaching a series of abilities for a more efficient performance, and include (Meichenbaum y Asarnow, 1979, Meichenbaum, 1985): (a) identification and definition of the problem and self-questioning (for example, “what do I need to do now?”); (b) an attempt to focus attention on the problem; (c) specific strategies to carry out the test and guide to the answer, (for example, “now I will stop and carefully repeat the instructions.”); (d) self-reinforcement for having tried, including evaluation and self-evaluation, (“well, I’m doing fine.”), and (e) coping abilities and proposal for error correction. “This is OK. Even if I make a mistake, I can always go more slowly.” Such cognitive training should be given, furthermore, by means of a wide range of tests, tasks, and people (trainers, teachers and parents) in order to make sure that the child does not develop a response to a specific task, but a generalised strategy (Meichenbaum and Asarnow, 1979).

Another type of interesting verbalisations were the ones used by Brown, Wynne and Medenis (1985) in their cognitive behavioural therapy training scheme for children aged 6-11. By following Meichenbaum and Goodman’s (1971) self-instructional training scheme, they used what they called Super Hero Thinking Cards, which visually modelled the strategies to teach. (1) What is my problem, and what do I have to do? (2) How can I do it? (3) Am I thinking and using my plan? (4) If I make a mistake, I can go back and... correct it. (5) How did I do it? (6) You can do that too. You only need to learn my Super Thinking Tricks.

COGNITIVE-BEHAVIOURAL TREATMENT PROGRAMMES

For some years, self-instructional treatment was seen as a panacea at the head of the behavioural intervention programmes predominant at the time. Self-instructional treatment proved effective in reducing impulsiveness (Weithorn and Kagen, 1979; Brown, 1980), in increasing planning, concentration and reasoning capacities (Meichenbaum, 1976), in improving social skills (Shure, 1981) and in increasing academic performance (Cameron and Robinson, 1980; Abikoff and Gittleman, 1983). However, although numerous studies confirmed their efficiency (Hinsch, Henker and Whalen, 1984; and Konstantareas and Hermatidis, 1983, among others), some other studies could not corroborate such positive results (Abikoff and Gittleman, 1985, among others). Meichenbaum (1977, 1992) makes some clinical suggestions to implement these programmes successfully: (1) use the child’s play environment to initiate and model self-talk; (2) use useful tests to train sequential cognitive strategies; (3) use peer teaching to obtain children’s cognitive patterns; (4) apply the programmes to the child’s rhythm and build up a self-statement pack; (5) keep the child from using self-statements in a mechanical way; (6) include a therapist who encourages the child to respond; (7) learn and use self-instructional training with low-intensity responses; (8) complement the training by using images such as the turtle technique (Scheider and Robin, 1976); (9) complete self-instructional training with correspondence training (Roger, Warren and Baer, 1976) and (10) complete self-instructional training with operative procedures such as response cost.
During the following years there was an attempt to overcome the limitations of mediational cognitive therapy by the combination of other elements, both cognitive and behavioural, which included self-evaluation, self-register, training in exploration strategy and solution of cognitive, social and academic problems, such as role-playing, self-reinforcement, self-punishment, response cost or time-out (Barkley, Copeland and Sivage, 1980).

In 1985 Meichenbaum defined a series of characteristics common to all these cognitive behavioural training therapies, either when applied to impulsive children or to children with social or academic disabilities. Such characteristics are still in use in the currently applied cognitive behavioural therapies. These programmes: (1) involve students as active participants or collaborators in their own learning process; (2) use open or external verbalisations as a starting point in the use of covert or internalised verbalisations and more specific verbalisations are used as a step for further more generalised verbalisations; (3) require careful analysis of the task and identification of the desired response across the development of a series of phases, (4) make use of modelling and repetition of task specific strategies elaborated out of children’s previous knowledge and abilities; (5) highlight the teaching of executive or metacognitive general strategies and (6) include prevention of relapses (in the sense of early reactions to failure and setbacks) and programmed generalisation.

The apparent ineffectiveness of many of these studies could be due to the small size of the samples, to the diversity and magnitude of the treatments used, the inflexibility of the packs, which were used irrespective of the characteristics and history of each subject, to the variable severity of the syndrome, the ages when used, the inclusion or not of pharmacological treatment or the existence of generalisation programmes which can transmit the knowledge learnt to the school setting (Orjales, 1981; Moore and Cole, 1978, among others) as regards difficulty of generalised school performance (Douglas & col., 1976) to lack of significant findings. (For a more exhaustive review, see Meichenbaum, 1992, and Orjales and Polaino Lorente, 1988).

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In spite of the fact that programmes of cognitive behavioural training are still been used in the treatment of children with ADHD over the last few years (Orjales 1991; Tomás, Jarque, Gómez and Miranda, 1998; Calderón, 2003; Miranda, Soriano, Presentación and Gargallo, 2000; Miranda, García and Presentación, 2002; Miranda et al., 1999; Arco, Fernández Martín and Hinojo, 2004; Miranda, Jarque and Rosel, 2006 ), more studies are necessary, not only those which focus on establishing the specific weight of the techniques used but most importantly, on elaborating cognitive behavioural profiles which, together with age and the degree of deterioration, allow for the establishment and selection of the most adequate corresponding techniques.

On the basis of the above, and if we consider that the hyperactive child’s problem lies in lack of self-control and inhibition, failure to guide his conduct with internal instructions and inability to rectify inappropriate behaviour (Barkley, 1998), the treatment will need to aim at developing measures to inhibit activated responses (reduce cognitive and behavioural impulsiveness), to cope with distraction and to optimise executive performance.

It seems indisputable, therefore, that within a basic intervention programme addressed to an ADHD patient (apart from the relevant and no less important educational and training programmes for parents and teachers) the following aspects need to be taken into consideration: pharmacological treatment (with detailed study of the need for its application, the time, dose and type of medicine to be used) and the application of behaviour, emotional and cognitive techniques; within the latter and with special weight, self-instructional training, among others.

NEW CONTRIBUTIONS TO SELF-INSTRUCTIONAL TRAINING

For over fifteen years I have included self-instructional training within cognitive behavioural programmes that I have designed and applied to specific cognitive, emotional, social, behavioural and academic profiles of children with ADHD. In the year 1991 I developed a cognitive behavioural programme for the treatment of children with this disorder to be applied in the school setting over thirty sessions. The programme included the application of techniques such as (Orjales, 1991): training the child with ADHD to evaluate their own participation in the programme and each one of the sessions modelling, training to identify feelings; to solve cognitive, academic and social problems; social reinforcement; positive individual and group self-reinforcement; the turtle technique; the protagonist of the week; the use of co-therapists; training in relaxation techniques; self-instructional training following Meichenbaum’s (1971) phases, and a specific programme of self-instructions to be generally applied in the classroom. (For a detailed review of the sessions and materials used, see Orjales and Polaino-Lorente, 2001).

For the design of the self-instructional training programme, I made a first adaptation, basing my work on Meichenbaum’s writings and I incorporated support pictures. In this first adaptation, following the phases of mediational cognitive training by
Meichenbaum, the children had to repeat the following instructions until they were internalised, and they also had to apply them to different types of tasks: (1) Definition of the problem: “What do I have to do?” (2) Approximation to and setting out of general action strategy: “Now I know what I have to do. How am I going to do it?” (3) Attention focus on execution guidelines: “I need to be attentive and look at all the possible answers.” (4) Choice of answer and self-evaluation: “I think this is the right answer. Have I done well?” (5) Self-reinforcement and assessment of possible alternatives for correcting the mistakes made. If right: “Great! I’ve done well!” If wrong: “Why have I failed? (I go over each step). Next time I’ll try to go more slowly and won’t make that mistake. I’m sure I’ll do it better!”

For this first adaptation I designed support pictures as appear in picture 1, steps 2-6 (later on I included step 1, which will be explained further on). For over ten years I have used this self-instruction as a part of the cognitive behavioural training programmes that I have carried out with children with ADHD and contrary to what some authors think, I can state that from a clinical point of view, this type of intervention has proved effective in subjects becoming aware of the thinking processes implied in problem solving, in reducing the impulsive reactions immediate to the presentation of a task, in achieving more reflective and systematic information processing and in helping the development of problem solving strategies.

The self-instructions, especially the last one (step 6) have proved especially useful for training in self-evaluation and for attributional training, they have reduced the perception of school failure by helping the children to become aware of and to define their errors (for example, “I failed the exam because I failed three problems as I forgot about carrying over”) and by avoiding wrong, internalised and negative attributions (“I failed the exam because I’m hopeless at maths.”)

EXTENSION OF THE SELF-INSTRUCTION MODEL

After the first few years when this first adaptation of Meichenbaum’s self-instruction model was applied (chart 1, steps 2-6), I came across some difficulties which led me to the conclusion that an addition was necessary which included one more self-instruction, prior to the former ones (Orjales, 1999). Meichenbaum’s instructions start with a first instruction attempting to make the child become aware of what the problem is (identification and definition of the problem), which in our model was materialised as the verbalisation of the self-instruction: “I must be sure that I know what I have to do.”

The big part of academic and re-education tasks is based on tasks which require the reading comprehension of a short statement. During the first few years of training with my first adaptation of the self-instruction model, I noticed that, as the children were being trained, they said this first step to themselves and memorised it and addressed their sights straight towards the reading of the written statement, so ignoring other contextual information relevant for the comprehension of the instructions. I noticed that, previous to the reading of the statement and differently from reflective children, children with ADHD seldom carried out a general visual search which allowed them to position themselves in the task, for example, by looking at the number of exercises to be done, by previously matching the reading with the correct statement corresponding to each exercise, by spending a few seconds to look at the pictures and the possible number of choices or, most importantly, by noticing the inclusion of an example which illustrates how the task must be carried out. I noticed that this lack of previous analysis of context was evident, it greatly reduced the comprehension of the written instructions after a first reading of the statement and it was associated, in the child with ADHD, to one of the following reactions: (1) lack of motivation and decrease in the distraction threshold (which in cases of low tolerance to frustration might lead even to withdrawal from the task); (2) increasing complementary demands for help from the adult (so reinforcing these children’s natural tendency to emotional dependence) or (3) spending extra time on re-reading the statement, in most cases, without searching for additional information.

This last more reflective attitude is uncommon in children with ADHD, although it is more likely in the least affected children, those who have not yet developed the two most frequent secondary emotional symptoms of this disorder (low tolerance to frustration and low tolerance to effort), or in those children who have support medication and so cope with fatigue better. In any case, it seemed necessary for them to comprehend written instructions as far as possible, in order to avoid unnecessary re-readings by children who get more tired with tasks that require continuous attention, due to the characteristics of their disorder.

In the year 1999, in an attempt to make up for these difficulties (Orjales, 1999), I incorporated into our clinical actions one more step which would be previous to the model of self instructions that I had been using with my team throughout all these years. Inspired by one of the instruments in the Instrumental Enrichment Programme by Feuerstein and Hoffman (1994), this new self instruction was finally established as: “First I look and say all that I see,” and this would become the first instruction that the child applied within the extended self-instruction model.

By utilising the same type of model with non covert verbal self-instructions that is used with the rest of the self-instructions, it is expected that the children will first apply and make automatic, then make a self-instruction that favours a previous contextual analysis that may come in useful as an introduction to the task. The inclusion of this new self-instruction, “First I look and say all that I see,” has shown the following advantages in clinical practice: (1) It favours the inhibition of immediate emotional responses to a first reading of the statement without having analysed the context; both the positive responses, “It’s so easy. Now I know what I have to do,” and the negative responses, “This is very difficult. I’m never going to understand it,” or “This card is wrong.” (2) It assures a more comprehensive perception of the contextual
information which is relevant to the task, which favours the comprehension of the instructions from the first very reading, so avoiding re-readings that might make the child tired and it also favours facilitating the retention of information in the work memory. (3) On the basis of such contextual information, it increases the probability that the child may generate hypotheses about the content of the statement and the objective of the task (precautions capacity), which the child will confirm or reject after applying the following self-instruction, which was the first instruction in the former model, “I must be sure that I do know what I have to do.”

PROCEDURE FOR APPLYING THE EXTENSION OF THE SELF-INSTRUCTION MODEL

Although the extension of this self-instruction model (Orjales, 1999) follows the same phases described by Meichenbaum and Goodman (1971), it puts special emphasis on the initial model phase. We know that the hyperactive child tends to process information superficially by means of a more acoustic than semantic procedure (Polaino-Lorente, 1984) that he does not establish relationships or categories between the elements perceived. For this reason, during the training in self-instructions with the new model, the therapist needs to put special emphasis on the modelling phase of the first self-instruction (First, I look and say all that I see.) Otherwise, the child will proceed with a superficial, unstructured and more visual than semantic analysis. For example, in front of an attention type-card in which the child needs to look for figures identical to the figure pointed out as a model, he will first verbalise “First, I look and say all that I see” and then rush into a superficial analysis of the content of the cards, for example, “I can see elephants, bears and, I don’t know what this is, one of those things for making coffee,” instead of carrying out a better organised and more consistent analysis in their work memory, as following the case would be, “I can see a rectangular card; it is not a square because its four sides are not the same. There is a picture of a pencil drawing at the top of it. There are sentences inside that say what I have to do in this card. Below, on the right hand side, it says 35, the number of the page. An orange line comes out of the pencil tip and surrounds the whole card. There are four rows of pictures within this rectangle; the first row is elephants; all of them alike because they are not the same. Then there is one more row with bears, a third row with watering cans and the last row is, what? Oh, yes; they look like tea pots. The first picture of each row is within a square. Why? I guess, it must be the picture that is working as a model”.

THE SELF-INSTRUCTION MODEL AS A GUIDELINE ON THE CHOICE AND SEQUENCING OF THE TASKS USED IN COGNITIVE TRAINING

The researchers into mediational cognitive training have thought about the application of the general self-
instruction model to various cognitive, academic and other types of tasks. Over the last ten years I have used an adapted self-instruction model (1991) and the extended self-instruction model (1999) in order to organise, as well, the sequencing of cognitive training tasks. In this way, self-instructions are not only applied to each specific task, but are also used as a guideline on the choice and sequencing of the tasks to do. Thus, to begin with, the therapist chooses the tasks that reinforce the first self-instruction; then, those that reinforce the second one, and so on. In this way, the therapist organizes the training as follows:

1) As a reinforcement for the first self-instruction ("First I look and say all that I see.") the therapist chooses, firstly, those tasks that can reinforce visual search strategies and observation strategies: searching for differences between the two pictures, choosing the picture that is just the same as the picture used as a model, looking for what is missing in a picture, and so on.

2) As a reinforcement for the second self-instruction ("First I need to be sure that I do know what I have to do.") the therapist chooses tasks that can reinforce the comprehension of complex written statements. In order to reinforce this step I developed a training programme for decoding written instructions (Orjales, 2000c, and Orjales, in press).

3) As a reinforcement for the third self-instruction ("How am I going to do it?") the therapist chooses tasks that can reinforce cognitive flexibility and training in problem solving strategies for each type of task. Here the therapist chooses activities that allow the child to understand that there are different ways to carry out the same activity, by choosing mathematics problems, copying dot figures, labyrinths, puzzles, or games such as tangram, among others. This sequence allows training in self-instructions and specific strategies for each type of task.

4) As regards the fourth self-instruction ("I need to be very attentive and look at all the possible answers.") the therapist chooses tasks that allow the child to verify the usefulness of analysing the different possible answers before making a decision, for example, by training the child in the analysis of possible movements in games such as checkers or noughts and crosses. In this way, the self-instructions are, by themselves, a comprehensive thinking scheme for cognitive training and also a guide for the choice and sequencing of the material used in the training.

5) As regards the fifth self-instruction, the therapist chooses tasks that can be evaluated on the basis of various criteria that allow the child to contrast their self-evaluation with the evaluation carried out by the therapist and facilitate attributional training.

The effectiveness of self-instructional training requires learning about the cognitive, behavioural, emotional and social profiles of the child; carefully choosing from the self-instruction model and using it at the right moment of the treatment; choosing and sequencing the tasks to carry out, all of that within a training programme with four levels which need to bear in mind the metacognitive development of the child.

Level 1 refers to the child’s training to become aware of the existence of thinking processes and problem solving strategies. Before starting to explain the self-instruction model to the child, it is recommended to ask him to carry out a given task aloud while the therapist discretely takes notes of the sequences of his actions (decisions made, strategies used, mistakes or rectifications made, and so on). Once the child has completed the task, he will be asked to make up a list with the steps he would give a partner the same age who would like to complete this task without making the same mistakes. Comparing the child’s list with the therapist’s list will give the child a clear image that he has made decisions and applied many strategies without having been aware of them.

Meichenbaum (1976) suggested that the child should be told about the existence of an internal dialogue, about the great variety of factors that influence the way the internal dialogue is uttered (objectives, attributions, expectations, and so on), and furthermore, about the way that internal dialogue influences decision making and the choice of various strategies (the set of thoughts and images that each person generates) in order to later set out how it is reflected on behaviour and on the tendency to make certain mistakes. All of this is useful to make the child understand that he can modify his behaviour if he modifies his internal dialogue and make it more efficient. These ambitious objectives depend on the child’s age and will be achieved across the following training levels.

In level 2 lies the repeated application of self-instructions to all types of tasks, which influence twice as much those tasks in which the child manifests some specific difficulty, so making it possible for the child to perceive improvement of their performance when they carry out the tasks in a reflective manner.

Level 3 would consist of training to extend the application of self-instructions onto other contexts of the child’s life without the explicit inducement of an adult and level 4, the most specifically cognitive training, organized in such a manner for the child with ADHD to get to know about their weaknesses and also recognise the situations and the types of tasks in which they need to restrain their impulsiveness and bring to light all the repertoire of known strategies, including the possibility of using open or externalised verbalisations.

We still need scientific evidence that proves that children with ADHD may develop a really reflective thought processing style with time. In my clinical experience I have seen how children who have been trained for two years keep to a more reflective attitude and apply strategies learnt in those two or three years after having been discharged from the programme, even when they have not received any specific treatment whatsoever during that period.
Nevertheless, everything impresses those children who apply those strategies only or, especially, when the situation gives the task to do a special importance (an exam, follow-up exploration, and so on) or when they identify the task as complex and/or perceive some risk of failure (whenever they feel that failure is under their control). If the task is not perceived as difficult, which happens, for example, when they first carry out an apparently simple task such as the Test of Continuous Performance by Conners, they show their naturally impulsive thought processing style. I join those who support the hypothesis that this type of intervention programme for six- to twelve-year-old children with ADHD may provide an important resource to improve their cognitive performance, but cannot by itself completely modify their impulsive nature.

Self-instructional training is a useful technique, but only a small part of the multidimensional programme that is required for the treatment of children with ADHD. Such training needs to lie in a family action plan, a school intervention programme and a specific treatment for the person affected by ADHD, which needs to include the assessment of a possible pharmacological treatment and an intervention programme which is not only cognitive/metacognitive and behavioural, but also emotional. The specific weight that each of these programmes may have in the treatment of subjects with ADHD will depend on age, personal, family and social characteristics and especially, on the current or potential level of maladjustment occurring in an immediate future.

The use of a self-instructional training programme seems to be especially suitable for the cognitive programme of impulsive children between six and twelve years of age. Earlier studies confirmed greater effectiveness of general self-instruction in children aged 8-12 (Kendall and Wilcox, 1980) and of specific self-instructions for children of six or seven years of age (Denny, 1980). In children older than twelve the usefulness of this type of treatment needs to be weighed up. The older the children are, the greater the degree of automatism of their thinking patterns, and the more difficult the modifications in this sense is. Furthermore, the intervention with the majority of preadolescents acquires other priorities which are put before an attempt of cognitive change.

More simple adaptations of specific self-instructions can be carried out successfully with preschool children (Bornstein and Quevillon, 1976; Tomás, Jarque, Gómez and Miranda, 1998, among others), but rather than with the objective of achieving autonomous and immediate management of the instructions, with the no less important objective of immersing the children in their use in order to educate them.

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