

### Web Health Application for ADHD Monitoring (WHAAM): Context-Driven Framework

Alves, Silvia; Bamidis, Panagiotis; Bilbow, Andrea; Callahan, Amy; Chiazzese, Giuseppe; Chifari, Antonella; Doherty, Gavin; Janegerber, Sarah; McGee, Colin; Merlo, Gianluca; Myttas, Nikos; Nikolaidou, Maria; Rinaldi, Rosalia; Sanches Fernandes Ferreira, Manuela; Santos, Miguel; Sclafani, Matteo; Seta, Luciano; Silveira-Maia, Monica

Veröffentlichungsversion / Published Version

Forschungsbericht / research report

#### Empfohlene Zitierung / Suggested Citation:

Alves, S., Bamidis, P., Bilbow, A., Callahan, A., Chiazzese, G., Chifari, A., ... Silveira-Maia, M. (2013). *Web Health Application for ADHD Monitoring (WHAAM): Context-Driven Framework*. <https://nbn-resolving.org/urn:nbn:de:ssoar-87727-5>

#### Nutzungsbedingungen:

Dieser Text wird unter einer CC BY-NC-ND Lizenz (Namensnennung-Nicht-kommerziell-Keine Bearbeitung) zur Verfügung gestellt. Nähere Auskünfte zu den CC-Lizenzen finden Sie hier:

<https://creativecommons.org/licenses/by-nc-nd/4.0/deed.de>

#### Terms of use:

This document is made available under a CC BY-NC-ND Licence (Attribution-Non Commercial-NoDerivatives). For more information see:

<https://creativecommons.org/licenses/by-nc-nd/4.0>



Web Health Application for Adhd Monitoring

## Context-Driven Framework

Transversal Programme  
Key Activity 3: Information and Communication Activities  
in Lifelong Learning Programme 2007-2013  
<http://www.whaamproject.eu>

# CREDITS

---

This booklet has been produced during the WHAAM project and funded with support of the European Commission.

## **AUTHORS:**

Alves Silvia

Bamidis Panagiotis

Bilbow Andrea

Callahan Amy

Chiazzese Giuseppe

Chifari Antonella

Doherty Gavin

Janegerber Sarah

McGee Colin

Merlo Gianluca

Myttas Nikos

Nikolaidou Maria

Rinaldi Rosalia

Sanches Fernandes Ferreira Manuela

Santos Miguel

Sclafani Matteo

Seta Luciano

Silveira – Maia Monica

## **EDITED BY:**

Antonella Chifari

## **TRANSLATOR:**

Marzia Lisciandrello

## **FIRST PUBLISHED:**

August 2013

## **WEBSITE:**

<http://www.whaamproject.eu>

## **E-MAIL CONTACT**

[whaampartners@pa.itd.cnr.it](mailto:whaampartners@pa.itd.cnr.it)



Publication licensed under a Creative Commons Attribution – Non Commercial – No Derivatives 4.0

International License. Copy of the license is available at <http://creativecommons.org/licenses/by-nc-nd/4.0/>

ISBN 978-88-903133-8-7

# TABLE OF CONTENTS

**INTRODUCTION.....**  
**5**  
Some choices in the WHAAM project .....  
6  
Treatments in WHAAM Project .....  
6  
Monitoring ADHD .....  
8  
Technology for ADHD treatment .....  
9

## **PART A**

**11**

**THE ATTENTION DEFICIT HYPERACTIVITY DISORDER .....**

**12**

**ASSESSMENT .....**

**20**

1. The diagnostic process .....  
20
2. Classification of the assessment tools identified by the Partnership .....  
22
3. Direct observation .....  
39
4. Functional assessment methods for evaluating challenging behaviors .....  
41

**SCHOOL CONTEXT .....**

**45**

1. ASSESSMENT .....  
45
2. INTERVENTION .....  
51
3. SUPPORT .....  
58

**FAMILY CONTEXT .....**

**65**

1. ASSESSMENT .....  
65
2. INTERVENTION .....  
70
3. SUPPORT .....  
73

**PEERS CONTEXT .....**

**83**

1. ASSESSMENT .....  
83
2. INTERVENTION .....  
84
3. SUPPORT .....  
86

## **PART B**

.....	<b>92</b>
<b>ICT MONITORING FOR ADHD 1st part .....</b>	
<b>93</b>	
<b>ICT MONITORING FOR ADHD 2nd part .....</b>	
<b>104</b>	

## **PART C .....**

**121**

<b>THE DESIGN OF THE WHAAM APPLICATION .....</b>	
<b>122</b>	
1. Architecture .....	
122	
2. The WHAAM application design and development process.....	123

## **REFERENCES .....**

**127**

Introduction .....	
127	
General concept about ADHD.....	
127	
Individual risk factors .....	
128	
Comorbidity .....	
128	
Multimodal Treatment .....	
130	
Assessment tools .....	
130	
Direct observation and Functional Assessment .....	
135	
School context: Assessment .....	
137	
School context: Intervention .....	
140	
School context: Support .....	
141	
Family context .....	
143	
Peers context .....	
147	
ICT based tools for ADHD .....	
150	
The WHAAM application design and development process .....	
150	

# **INTRODUCTION**

---

The main purpose of the WHAAM project is to develop a new culture able to cope with ADHD through well-researched evidence-based approaches using mainly specific school contexts. To gain the best from the program the approach needs a specific short introductory training period. The training involves the subject with the condition as well as parents, teachers, classmates, health services and providers of other professional

services. There are many different scientific studies that have demonstrated the importance of supporting an intervention with the seamless actions of monitoring and assessing. As ADHD is a lifelong condition it will be of no surprise that the treatment often lasts for substantial periods of time. These periods of treatment may well stretch out to years and necessitate the inclusion and support of many different people to help support as the subject moves through changing environments. It also needs the appropriate use of comparable evaluation procedures throughout the monitoring of these changes.

The initial idea behind the WHAAM project was that the use of Information and Communications Technology (ICTs) in the sectors of health and personal well-being can enhance the spread and approaches of ADHD treatment. During the project new applications and new online services will be developed to support both the family and the school in the application of personal intervention plans for the ADHD subjects. The rationale is that technology can help promote the establishment of new environments, integration and well-being, not only of subjects with ADHD, but also of family members, school personnel and their peers.

But if technology is to be useful it has to be based on a well-founded theory. One of the first activities planned for the WHAAM project focused on the study of scientific approaches of these topics, to identify a common knowledge base and share ideas which will in turn drive the design and the realization of the WHAAM application.

This Framework (FW) is a result of this activity. It represents the experiences and vision of the project partners and defines the general background needed to develop both the WHAAM application and the online services. It does not intend to describe definitively ADHD, or discuss the different models developed to explain how ADHD can function, or its causes and consequences. A lot of approaches have been developed to treat ADHD in the course of time, and many manuals and web sites are able to provide excellent resources on these topics. This FW was intended as a work instrument drawn from the Partners experiences, stories and instances in which the use of technology has been introduced and used to both inspire and develop the subsequent activities of the projects.

This FW was divided in three parts.

In part A some general themes concerning ADHD were analyzed. This discussion was useful in developing the project aims. As you can expect our views are different to other available resources on ADHD. In fact, the FW is centered on and around the specific life contexts of the subject, school, family and social relations with peers. Each context was analyzed through three areas characterizing the treatment of the disorder these are assessment, intervention and support. In this part of the project significant attention was paid to the partners' specific experiences and to gain international experience and vision of ADHD.

Part B's aim was to deepen the analysis of the relationship between use of ICT and the treatment of ADHD. Some of the tools we developed in this sector will be shown. Our objective was to clarify functions and characteristics of the WHAAM application in a complex "media ecosystem" where the most suitable and effective tool does not always prevail. The design of this application considers many different factors including the ease of use, theoretical coherence and effectiveness. We also wanted the WHAMM application to be able to be used on a number of electronic devices and through the more traditional approaches currently used by professionals.

Finally, part C will briefly illustrate the main features of the WHAAM application. In particular it will explain how the functions in the application and various interfaces are used.

The WHAAM project considers the development of a new application to manage both the monitoring process and an online service, which is accessible by both PC and mobile devices as a significant step forward. The design work of these services and resources was carried forward by the project partnership consistently with the methodology defined and discussed in the part A of this FW.

## **Some choices in the WHAAM project**

---

As it was previously discussed, the WHAAM project is intended to verify the impact of the use of ICT in the management of ADHD intervention processes in everyday contexts. Initially this will be in a school environment. This intention may seem too general without some preliminary answer to some of our questions:

- Is a specific treatment more suitable to integrate ICT? In other words, is the project aimed at developing an application that is sufficiently flexible to enable it to be used in many different situations, during different treatments, or is the objective to support only specific types of treatment?
- Can you only apply the technology at specific moments of the intervention? If so, in which phases can the technology be more useful?
- How to integrate technology with a complex therapeutic process while considering the phases, which are before and after the treatment in the strict sense?

This introduction is intended to answer these questions. In the other parts of the FW the methodologies and technologies in use for ADHD will be discussed more widely.

## Treatments in WHAAM Project

---

In other sections of this FW some of the methodologies and approaches applied in the ADHD treatment will be discussed while focusing closely on the *behavioral* and *cognitive-behavioral* interventions described. The reasons for our choice will be explained in the following.

There are many research papers and studies that have highlighted the impact of ADHD and the difficult challenges that are often associated with this disorder. These papers will often provide highlight examples of the difficult personal lives of students, teachers and indeed the whole scholastic organization. In recent years, especially after the results of the Multimodal Treatment Study for Children with AttentionDeficit/Hyperactivity Disorder (MTA), a new consensus is emerging on the efficacy of the multimodal approaches. These approaches allow us to see the effects of both the use of drugs to support behavioral interventions and training programs of parents and teachers. They often take place in different life contexts and are targeted to reinforce the therapeutic alliance among subject, parents, teachers, peers, health operators and the other persons involved during the treatment and the monitoring of this behavioral disorder. The WHAAM project intentionally focuses on types of intervention that are applied to everyday contexts. This is done with the awareness that other treatments are ignored, even if their efficacy is recognized. This is especially so when the implementation demands an experimental apparatus that needs to be administered in a strictly controlled laboratory system. For example, we will not discuss any therapies based on *mindfulness*, *metacognition*, interventions for *dietary control*, protocols for *neuro-cognitive training* and *neuro-feedback*. We will include the use of drugs to help manage ADHD which we note are used frequently but were not part of our specific discussions in the project.

Our choice has fallen on psycho-social treatments based on techniques of *contingency management*. Often described as *behavioral interventions*. These will include the integration of these techniques with procedures for the modeling of some cognitive processes, namely *cognitive-behavioral approaches*. When the application of these approaches is linked with the use of drugs we talk about *combination treatments* and *multimodal treatments* when the interventions take place simultaneously in different life contexts.

This choice has the advantage of immediately directing the research and the design of the application and avoids one of the major flaws that often occur in the application of ICT in the health and well-being field. That is, the idea to adapt some technological solutions that have been developed in completely different sectors to the current therapeutic context. It was also based on the results of the specialist literature, which iare identified in *behavioral interventions* (BI) (Pelham Jr. & Fabiano, 2008), and *cognitive-behavioral interventions* (CBI) (Knouse & Safren, 2010), as well as that in the *training programs for parents and teachers*, that the most effective approaches to deal with ADHD as a *first line treatment* is therapeutic interventions in combination with pharmacological treatments.

In particular, the BI and parents/teachers training programs were assessed as effective and evidence-based strategies by several studies and meta-analyses, both for individuals in pre-school age and for children and

adolescents in school age (Pelham Jr., Wheeler, & Chronis, 1998), (Ghuman, Arnold, & Anthony, 2008), (Pelham Jr. & Fabiano, 2008), (Fabiano et al., 2009), (Rajwan, Chacko, & Moeller, 2012). In the scientific community the debate was opened about what must be the recommended first-line treatment for children and adolescents with ADHD, behavioral therapy or medication? (AACAP, 2007), (AAP, 2011). There is a lot of support for the BI approaches. Firstly, the growing empirical evidence about their effectiveness and that there are fewer side effects than the use of medications. There is also the greater acceptability by families, teachers and the subjects themselves. Moreover, the effect of medications is limited in time and is closely linked to when the medication is present in the child. The BI strategies appear to be effective during and even beyond the period of treatment.

This debate has led to the development of intervention policies that currently tend to differentiate the strategies on the basis of the subject's age and the association with other disorders or co-morbidities. The BI approaches accompanied by parents/teachers training programs generally appear as first-line treatment for ADHD, especially in the case of pre-school and school age (4-11 years) subjects, either alone or in combination with medication.

With regard to CBI approaches the situation is not so clear or evident. In particular, the efficacy of these approaches only appears sufficiently supported in the case of adults when ADHD is associated with anxiety, anger management and depression problems (Mitchell, Benson, Knouse, Kimbrel, & Anastopoulos, 2013; Ramsay, 2007). In addition, these approaches are able to improve the motivation of parents, teachers and young people. It also helps them to overcome or reduce their negative thoughts and self-esteem issues which are usually related to their long-standing relationship with the disorder. But there is no clear experimental evidence about the effectiveness in the case of children and young people of school age (Pelham & Fabiano, 2008). The main explanations to justify these outcomes refer to the etiology of ADHD as well as to the nature of the cognitive processes, which the CB strategies act on.

In general, the main difficulties of subjects with ADHD are not solely due to deficits in information processing, but in the management of behavior in response to external stimuli and novelties (Barkley, 1997; Safren, Sprich, Chulvick, & Otto, 2004). These behaviors however, can change in the course of time. In fact it has often been observed that when a person with ADHD reaches adulthood and lives through the discomfort of the condition then new or different problems can arise. This presents additional challenges that require them to manage their changing moods, cognitive distortions and negative thoughts about their own abilities and skills (Knouse & Safren, 2010).

Several studies have discussed the effectiveness of CB approaches with the awareness that several factors can moderate the intensity of the effect. First a careful and clear differential diagnosis is crucial, since the CB approaches can be particularly useful in the presence of co-morbidities such as *oppositional defiant disorder* (ODD) or *conduct disorder* (CD) type.

In addition, it should be considered that following a CBI approach, based on the training of complex and demanding cognitive strategies will need to be supported by a strong motivation on the part of the subject to correct their dysfunctional behaviors. Such motivation may be seen in adults, struggling with managing their professional and economical future, but is unusual in school age subjects. In fact, in these cases the energy to push towards therapeutic intervention is often directed from parents or teachers, without the subject's real personal motivation (McCart, Priester, Davies, & Azen, 2006).

Finally, these treatments can be very effective if they are applied under the umbrella of parent/teacher training programs. This is particularly helpful if they have the aim of helping adults in direct contact with ADHD subjects. The subjects need to find ways of overcoming their cognitive distortions about the disorder, as well as the inevitable anxiety and anger that are often aroused by their long history of ineffective and unsuccessful interactions.

To summarize, the choice of the WHAAM projects principal focus on an intervention based on behavioral and cognitive-behavioral approaches allows a wide spectrum of strategies to use with subjects of school age. This will apply with not only core ADHD symptoms alone but also with challenging co-morbidities and they can be applied both in combination with or without medication.



It is important to consider that one of the main flaws in all these approaches is the lack of effective training programs which cascade their methods in an everyday context and are not only demonstrated in clinical settings under the control of expert psychiatrists. A great deal of research on this topic was conducted in the U.S., after the *Individuals With Disabilities Education Act* in 1997 (IDEA, 1997), renewed in 2004 with the *Individuals With Disabilities Education Improvement Act* (IDEIA, 2004). These documents establish the application of *Functional Behavioral Assessment* (FBA) procedures and the implementation of *Behavioral Intervention Plans* (BIP) to treat disabilities within the school context. This research has evidenced the strong influence on quality and effectiveness of the intervention plans based on the IDEA of the level of competency and training of the school personnel including the whole scholastic organization (Conroy, Clark, Gable, & Fox, 1999), (Kraemer, Cook, Browning-Wright, Mayer, & Wallace, 2008), (Cook, et al., 2012). Following these suggestions, the WHAAM project targeted the following issues: setting up technology tools and services aimed at support behavioral intervention plans, monitoring and assessment procedures and specific training programs. This means that well-established strategies that have strong *internal validity* evidence can prove their *external validity* especially when applied in more turbulent contexts.

## Monitoring ADHD

---

Following this first answer a second question emerged. At what stage of the therapeutic process could technology intervene? The WHAAM project made a clear choice. The decision was to focus on the monitoring process. This process is a set of actions that takes place typically during the treatment, but can extend beyond this period. Other process and themes are left in the background, for example, the diagnosis, the definition of the BIP, the management of communications and the quality assessment of the intervention, etc.

Moreover, the monitoring process in WHHAM is seen as a part of the *Functional Assessment* (FA) procedure in this case, the principal motivation is found within the scientific literature. In fact, the relevance of the FA has been highlighted in various studies on the implementation of behavioral interventions for ADHD (DuPaul & Ervin, 1996). There is not a general consensus about the meaning of FA (Dixon, Vogel, & Tarbox, 2012), in particular when seen in contrast with the *Functional Behavioral Assessment* (FBA) and the *Experimental Functional Assessment* (EFA). In the following the FA is deemed a form of FBA based on a specific model of the behavior.

The FBA is a collection of procedures used to observe the specific problem behavior of a subject. It is aimed at defining the function of this problem behavior within well-defined contexts. The observation can be indirect (uses what is reported) or direct (based on the observation of the subject in experimental or normal sessions). (Crone & Horner, 2003). When using the FBA, information is gathered using a number of different sources, such as interviews of the subject (with ADHD), parents and teachers questionnaires and direct observations of the subject are collected as supporting information.

The FA is a more directed observation procedure, aimed at formulating hypothesis about antecedents and consequences related to the specific problem behavior. This procedure studies the behavior within a person (operating mechanism) that can be triggered, enforced or even extinguished while acting on a relation stimulus-behavior-reinforcement (Mueller, Nkosi, & Hine, 2011).

Using this approach we begin with the monitoring process which starts with an identified approach that must record observational data using identified structured tools such as *ABC Charts*, *Scatter Plots*, etc.

The collected data has to allow the construction of functional patterns from observed events of the problem behavior. To be effective, the monitoring has to persist after the end of the intervention, at least until the behavior has become a habit for parents, teachers and other people in direct contact with the subject. This is one of the most significant factors to explain the efficacy of the BIPs and it also contrasts well with the observed effects from the relatively short duration of the pharmacological treatments.

The ability to apply the correct application of these procedures demands an intensive training. It is probably the main factor, which facilitates the lack of transmission of clear effective behavioral approaches among parents and teachers. The ICTs can play an important role to reduce the gap between theory and practice. It is

now possible to provide the parents or teachers a mobile application that supports them during the application of these structured procedures. It is also an online service and can be accessible everywhere and at any time. One of the strengths is that it is able to offer suggestions, to users, of tried and tested strategies and identify some avoidable mistakes. This was a major challenge for the WHAAM project.

The use of our technological support requires appropriate training to be able to perform the monitoring process according to the guidelines and to use the technology in the intended way. For this reason a key part of the WHAAM project is devoted to the design of and delivery of suitable training modules for both parents and teachers. From this simple activity some interesting suggestion for optimizing the use of the WHAAM application and services will emerge.

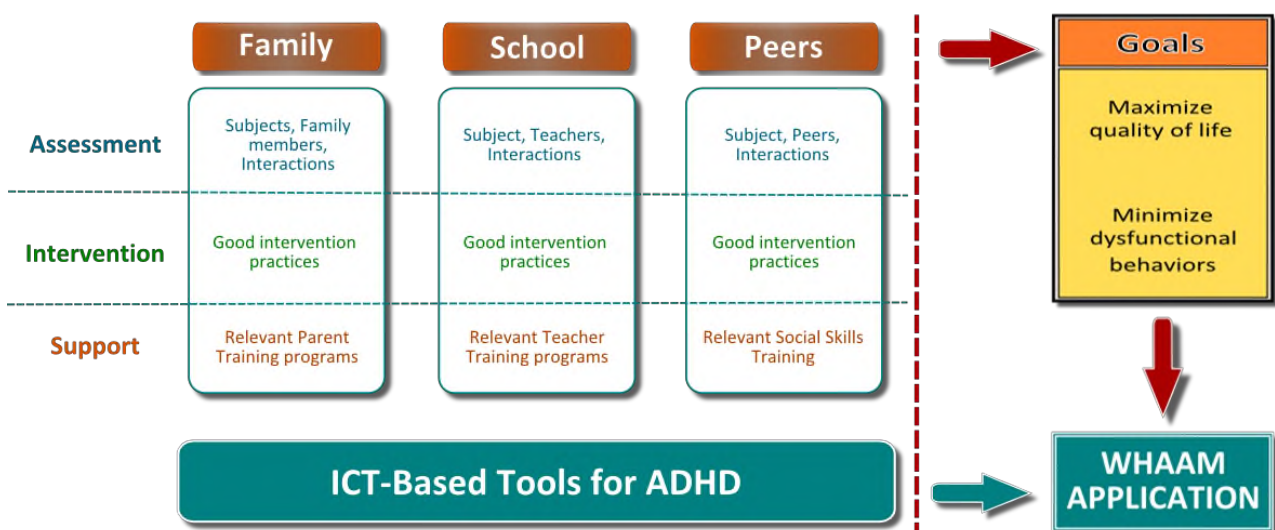
## Technology for ADHD treatment

The previous discussion has identified that the WHAAM project was organized around well-defined ideas. These are that we set up some technological resources that are able to support parents and teachers during a FA procedure, with particular focus on identifying and monitoring of the specific target behaviors. These monitoring activities are carried out within intervention methodologies that are based on behavioral and cognitive-behavioral approaches in everyday contexts such as in the family and school.

But these answers are not enough to avoid a techno-centric vision, without an equally clear answer to the third question, i.e. how the technology can be integrated within more traditional intervention plans for ADHD. In fact, the treatment has to be designed as long-term (on-going) activity that will have to follow the subjects during their main life activities. Linked with this is the idea that the use of this designed technology cannot be seen as a narrow and limited activity that does not impact on other phases of the therapeutic process.

To achieve this the WHAAM project analyzed the technology in connection with the whole management of the therapeutic treatment that consists of three phases: assessment, intervention and support. Moreover, each of these phases cuts through the everyday life contexts of the subject: family, school and the social relationship they have with their peers.

### Context Driven Framework - CDFw



The above figure outlines the structure of the *Context Driven Framework* (CDFw), i.e. a FW aimed at analyzing the different phases and contexts of the ADHD treatment to identify where and how the technology can be best used to minimize dysfunctional behaviors and maximize the quality of life of the subject with ADHD, and of other people in relation with him/her.

In general, the main tools for ADHD contained in the WHAAM APPLICATION (WA), i.e. an application to support the FA and the monitoring of specific behaviors for parents, teachers and health personnel. These can be used by online services that are web-based and open to the public with the intention to inform and guide the users of the WA.

The process of the design of the WA and the online services was carried on using a user-center approach. Starting from a discussion among the partners we developed a collection of *user stories*. These stories were discussed with stakeholder in order to refine the results and improve adherence with real life contexts. These tools were designed to accompany the different phases of the treatment and were planned with two other very important activities to enhance the positive impact of the introduction of the technology in the intervention process. Initially a training activity for parents and teachers on the use of the WA would demonstrate how the introduction of the technology goes hand in hand with the training on the use of FA in the support of the behavioral and cognitive-behavioral approaches. Second, a learning activity, aimed at health professionals and psychology students, to spread information about how new evidence and technology can dramatically improve the treatment of ADHD. This activity was planned as an e-learning module to integrate in the university curricula and is aimed at building an informed culture of ADHD treatments based on behavioral support and a '*new conceptualization of problem behavior*' (Crone & Horner, 2003, p.6). In the WHAAM vision the technology is a part of a richer approach to ADHD. It is neither the *nostrum* able to cure everything nor a simple tool to help in the normal execution of a therapeutic intervention. Technology is deemed a transformative apparatus that can deploy its effects only within a receptive context and by means of processes with an understanding of the theory.

# PART A

## THEORETICAL FRAMEWORK

---

# THE ATTENTION DEFICIT HYPERACTIVITY DISORDER

---

EDITED BY ALL PARTNERS COUNTRIES

## 1. General concept about ADHD

---

According to the fourth and current edition of the Diagnostic and Statistical Manual (DSM-IV, American Psychiatric Association, 1994, 2000), “*Attention-Deficit/Hyperactivity Disorder (ADHD) is defined as psychiatric disorders characterized by a developmentally inappropriate, pervasive (across different situations such as home and school) and persistent pattern of severe inattention, hyperactivity, and/or impulsivity with an onset in early childhood that is associated with substantial impairment in social, academic and/or occupational functioning*” (Banaschewski et al., 2010, p. 3). It is four times more frequent in boys than in girls and affects up to 5% of the school-going population. Often, comorbid conditions often co-existing with ADHD/ADD (Specific Learning Difficulties, Speech and Languages Problems, Dyspraxia and poor physical co-ordination skills, Oppositional Defiant Disorder, Conduct Disorder, Mood Disorders, Low Self Esteem).

Scientists and medical experts do not know precisely what causes ADHD. Scientific evidence suggests that the disorder is genetically transmitted (often runs in families) and is caused by a chemical imbalance or deficiency in certain neurotransmitters (chemicals that regulate the efficiency with which the brain controls behaviour). Being a neurobiological disorder it continues to persist into adulthood with different symptomatology in almost 60% of the ADHD population. So, as the presentation and challenges of ADHD change over time, clinicians must take a lifespan approach and follow patients closely, modifying their care and treatment according to the individual’s current needs.

Symptom domains for ADHD in DSM-IV:

### **INATTENTION**

- (a) Often fails to pay attention to details or makes inattention errors in tasks at school, at work or other activities;
- (b) Often has difficulty in sustaining attention in school work or play activities;
- (c) Often seems not to listen when spoken to directly;
- (d) Often does not follow the instructions completely and has difficulties in finishing schoolwork (without oppositional behaviour);
- (e) Often has difficulty organizing tasks and activities;
- (f) Often has aversion or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework);
- (g) Often loses material necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools);
- (h) Is often easily distracted by extraneous stimuli; (i) Often forgetful in daily activities.

### **HYPERACTIVITY**

- (a) Often fidgets with hands or feet, or squirms in seat;
- (b) Often gets up in the classroom or in other situations where one has to remain seated (in adolescents and adults may be limited to a subjective feeling of restlessness);
- (c) Often has difficulty in playing or engaging themselves quietly in activities;
- (d) Is continuously "moving" or acts as if "driven by a motor";
- (e) Often talks excessively;

### **IMPULSIVITY**

- (a) Often blurts out answers before questions have been completed;
- (b) Often has difficulty awaiting turn in games or group situations;
- (c) Often interrupts or intrudes on others (e.g. butts into conversation or games).

In addition to the requirement that a certain number of symptoms be endorsed, the diagnosis of ADHD also depends upon verification of several other key indicators (APA, 1994).

- First, evidence must exist that at least some of the symptoms were apparent and contributed to some degree of functional impairment when the child was younger than 7 years.
- Second, the diagnostician completing the evaluation must be able to document impairment from the ADHD symptoms in at least two settings (for example, in school and at home).
- Third, the child's inattention or hyperactive-impulsive behaviors must be shown to interfere with present functioning in social, academic, or occupational areas.
- The symptoms do not occur exclusively during a general development disorder, Schizophrenia or other Psychotic disorders which are not better justified by other mental disorders (e.g. Mood disorders, Anxiety disorders, Dissociative disorders or Personality disorders).

### *1.1. Sub-types*

Exist three different sub-types:

- inattention subtype when six of the nine "inattention" symptoms appear
- hyperactive-impulsive subtype if six of the nine symptoms are of the Hyperactive-Impulsive category - combined subtype if both subtype symptoms are present

### *1.2. Epidemiology*

The worldwide prevalence estimates of ADHD/hyperkinetic disorder (HKD) are highly heterogeneous. The large review of Polanczyk (Polanczyk et al., 2007) estimates the overall prevalence of ADHD is 5.3%,

calculated on 102 studies from across all world regions. In particular, the prevalence for children was 6.5% and for adolescents 2.7%. The prevalence in adults instead would amount to 4.4% (Kessler et al., 2006). This value is comparable with that found by Fayyad et al. (2007) according to which the prevalence of adults with ADHD is around 3.4% (range 1.2-7.3%).

The reasons for this variability seems to be explained primarily by the use of different diagnostic criteria (DSM-III, DSM-III-R, DSM-IV, or ICD-10), the source of information and the methodological characteristics of studies, so as by the requirement, or not, for impairment to be present in order for diagnosis to be made.

## 2. Individual risk factors

Nigg and collaborators (2010) have published a review where it was highlighted the role-played by geneenvironment interaction in relation to ADHD. The authors gathered the environmental risk factors into three macro-areas: pre-, peri- and postnatal that we have summarized in the table below.

<b>Pre-natal risk factors:</b>	<ul style="list-style-type: none"> <li>- pre-natal exposure to nicotine</li> <li>- pre-natal exposure to alcohol</li> <li>- pre-natal exposure to heavy metals</li> </ul>
<b>Peri-natal risk factors:</b>	<ul style="list-style-type: none"> <li>- low-birth weight</li> <li>- pregnancy complications</li> <li>- hypoxia</li> </ul>
<b>Post-natal risk factors:</b>	<ul style="list-style-type: none"> <li>- prematurity</li> <li>- diet</li> <li>- familiar events</li> <li>- psychosocial factors</li> </ul>

## 3. Comorbidity and differential diagnosis

In the most cases pure ADHD is rare, it is in fact almost always associated with comorbidities among which the most common are oppositional defiant disorder, fine and gross motor difficulties, learning and language problems, anxiety and depression (Kadesjö & Gillberg, 2001).

For instance, a study conducted in 2007 by National Survey of Children Health (NSCH) involving about 60,000 children from 6 to 17 (among them 5.000 with ADHD), found that the 67% of children with ADHD had at least 1 other reported mental health/neurodevelopmental disorder (compared with 11% in the population without ADHD)(Larson et al. 2011, p. 464). Furthermore, children with ADHD are supposed to have a higher probability of developing externalized disorders such as behavioural ones (Spencer, 1999; Wilens, 2002), rather than internalized disorders such as anxiety and depression (Jensen et al., 2001).

Obviously, the presence of these comorbid disorders has effect both on the symptoms manifested by the subject and on the prognosis, as well as on the choice of the most adequate therapeutic strategy (Patel et al., 2012).

<b>Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD)</b>	The 25-75% of those with ADHD meets the criteria for Oppositional Defiant Disorder or Conduct Disorder (CD) (Barkley, 1998; Barkley et al., 2002). To conduct a differential diagnosis is important to consider the onset of the disorder. Important to investigate also the familiarity, the parents' socioeconomic level and the social context.
--	--

**Anxiety** The comorbidity with anxiety varies from 10-40% (Barkley, 2006; Biederman et al., 2001; Schatz & Rostain, 2006; Tannock, 2009). Other studies suggest a comorbidity of 55% (Dell'Agnello et al., 2005).

Children that suffer of anxiety in a comorbidity with ADHD appear less impulsive, but more inattentive probably due to the moderation effect of the anxiety (Pliszka, 1992; Schatz & Rostain, 2006).

### **Depression**

Of this type of comorbidity there exist a great variability depending on the different studies. It varies between 10-30% to 75%. Mood disorders and depression occur as secondary to ADHD and is not necessarily a differential diagnosis. Children with ADHD, in fact, are victims of a lot of mental stressors, which make them paradoxically more impulsive, hyperactive and irritable. Also in this case is important to verify the familiarity.

**Bipolar disorders** According to an Italian study, 24% of 7-18 year old clinic attendees with bipolar disease had existing ADHD (Masi, 2006).

### **Tic Disorders and Tourette's Syndrome**

The Tourette's Syndrome is a neurodevelopmental disease characterized by physical and vocal involuntary tics. It is part of a larger spectrum of tic disorders and it is deemed hereditary and chronic.

ADHD is very frequent a condition in comorbidity with Tourette's Disorder (60-80%) (Freeman et al., 2000), and the onset of ADHD generally takes place before tics manifestation. With regard to subjects with chronic tics the prevalence rate of ADHD is about 50% (Freeman, 2007). As noted by Freeman the ADHD symptoms, especially in association with OCD and Learning disabilities, can "overshadow" tics, also considering the minimal impact of them on the subject's general impairment (Freeman, 2007, p. 1/16).

### **Obsessive Compulsive Disorder (OCD)**

The studies on OCD have put on evidence the relation between this disorder and dysfunctional prefrontal-striatal system. But some experimental results have highlighted that the deficit in the attention system was suggesting an abnormal functioning of anterior cingulate cortex (De Geus et al., 2007). This can help to understand the relation between OCD and ADHD, and the prevalence rates of ADHD among OCD subjects (about 24%) (Sheppard et al., 2010).

### **Sleep problems**

Many reviews regarding to the prevalence of sleep problems in children and adolescent with ADHD reported an estimated value between 25-50% (see Corkum et al., 1998; Owens, 2013). Regarding the main categories of sleep-related problems, Corkum and colleagues (1999) using a factor analysis distinguished 3 different types: dysomnia, i.e difficulty to get or to remain

to sleep; parasomnia. i.e night terrors, nightmares, sleeping walking and sleep-related involuntary movements. But there exist differences between the results obtained using objective measures, such as polysomnography and actigraphy, and the parental reports. Differences in sleep architecture and patterns was not observed using these measures, in contrast parents very often report sleep problems in their children (Owens, 2009).

In general, the more corroborate co-occurrences are between ADHD symptoms and specific sleep problems, such as obstructive sleep apnea, restless legs syndrome, and periodic limb movement disorder, but the casual relationship and common etiology are not clearly established.

An accurate assessment for sleep problems is suggested for children and adolescent with ADHD symptoms.

**Learning disabilities** Learning disabilities was defined as "a failure to learn that is not due to ability or inadequate teaching" (Semrud-Clikeman & Bledsoe 2011, p. 364). The most usual division of these disabilities, in according to the specific educational topic involved, is the following: reading dysabilities (RD) (ex. dyslexia), writing disabilities (WD) (dysgraphia, dysorthographia), mathematical learning disabilities (MLD) (dyscalculia), and nonverbal learning disabilities (NVLD) (combined deficits in visual-spatial learning, motor and social skills). The LD can be measured with different methodologies: ability-achievement discrepancy (AAD) using simple difference or predicted-difference method (Rust & Golombok, 1999); response to intervention (RTI) (Shinn & Walker, 2010); cutoff point; parent and teacher report. Regarding to the overlap between ADHD and LD there exist many different estimations, according to definition of LD and methods used to measure it. Cantwell and Baker (1992) reported a rate of 80% of ADHD children (aged 11) with LD. More realistic valuations reported measured prevalence rates ranging from 20 to 45%. (Frick et al., 1991; Sedmur-Clikeman et al. (1992), DuPaul et al., 2013).

The relationships between ADHD and LD is not clear: different hypothesis have been proposed and, currently, the most accepted explanation conjecture

is in some common neurophysiological deficits, with impairments in working memory and processing speed (Willcut et al, 2005). Also the hypothesis of a stronger relationship between LD and inattentive symptoms does not appear sufficiently supported, especially when WD are included in LD measures.

Regarding to ADHD and LD, it is important to establish evidence-based procedures to measure LD. In general, children with LD should be assessed also for ADHD symptoms, and vice versa. While in the presence of specific LD, tailored instructional interventions should be designed. Also the use of medical treatments for ADHD has to be carefully assessed considering their impact on LD and academic achievements.

With regard to deficient academic performances it is important to assess if these problems are secondary with respect to ADHD and a comorbidity to see if there is a specific LD able to generate behaviors characterized by hyperactivity, inattention, distractibility and rejection of learning activity.

**Motor Difficulties and Developmental Coordination Disorder (DCD)**

It is widely established that a relevant number of children with ADHD also present with motor difficulties these are mainly Developmental Coordination Disorder (DCD). Moreover, milder motor problems were also found in children with ADHD without a diagnosis of DCD (BrossardRacine et al., 2012). The main studies report that motor coordination problems within children with ADHD ranging from 30% to 50% (Barkley, DuPaul e McMurray, 1990; Hartsough e Lambert, 1985; Kadesjo e Gillberg, 1999; Szatmari et al., 1989; Stewart et al., 1966; Gillberg, 2003).

### 3.1. Associated developmental problems

---

As was discussed above, the subjects with ADHD are at risk to a large spectrum of psychiatric disorders but they can also incur in other developmental, cognitive and social problems. In the table below, extract by Barkley (2006), the most relevant impairments in association with ADHD.

**Summary of Impairments Likely to be Associated with ADHD**

*(The insertion of the table was authorized directly by Barkley and the Guilford Press).*



**Cognitive**

Mild deficits in intelligence (approximately 7-10 points)  
Deficient academic achievement skills (range of 10-30 standard score points)  
Learning disabilities: Reading (8%-39%), Spelling (12%-26%), Math (12%-33%), and Handwriting (common but unstudied)  
Poor sense of time, inaccurate time estimation and reproduction  
Decreased nonverbal and verbal working memory  
Impaired planning ability  
Reduced sensitivity to errors  
Possible impairment in goal-directed behavioral creativity

**Language**

Delayed onset of language (up to 35% but not consistent)  
Speech impairments (10% to 54%)  
Excessive conversational speech (commonplace), reduced speech to confrontation  
Poor organization and inefficient expression of ideas  
Impaired verbal problem-solving  
Co-existence of central auditory processing disorder (minority but still uncertain) Poor rule-governed behavior  
Delayed internalization of speech (>30% delay)  
Diminished development of moral reasoning

**Adaptive Functioning**

10-30 standard score points behind normal

**Motor Development**

Delayed motor coordination (up to 52%)  
More neurological "soft" signs related to motor coordination and overflow movements Sluggish gross motor movements

**Emotion**

Poor self-regulation of emotion  
Greater problems with frustration tolerance  
Under-reactive arousal system

**School Performance**

Disruptive classroom behavior (commonplace)  
Underperforming in school relative to ability (commonplace)  
Academic tutoring (up to 56%)  
Repeat a grade (30% or more)  
Placed in one or more special education programs (30%-40%)  
School suspensions (up to 46%)  
School expulsions (10%-20%)  
Failure to graduate high school (10%-35%)

**Task Performance**

Poor persistence of effort/motivation  
Greater variability in responding  
Decreased performance/productivity under delayed rewards  
Greater problems when delays are imposed within the task and as they increase in duration  
Decline in performance as reinforcement changes from being continuous to intermittent Greater disruption when non-contingent consequences occur during the task

**Medical/Health Risks**

Greater proneness to accidental injuries (up to 57%)  
Possible delay in growth during childhood  
Difficulties getting ready for bed and sleeping (up to 30%-60%)  
Greater driving risks: vehicular crashes and speeding tickets  
Greater medical expenses for family to bear  
Start sexual intercourse earlier as teens  
Greater risk of teen pregnancy (38%)  
Greater risk of sexually transmitted disease (16%)

## 4. Multimodal treatment of ADHD

---

Every approach with ADHD children must be modified to their personal characteristics, to their profile and to the environment in which they live.

The realisation of therapeutic protocols for the treatment of ADHD aims to reduce the seriousness of the symptoms and facilitates a good integration of the child in his own environment.

Undoubtedly, the child's wellbeing depends on his relationships with parents and teachers. As a consequence, the treatment of ADHD should involve all the people that are part of the child's life. The main goal of this integrated and multimodal approach is to encourage the adaptation of an ADHD subject within his own environment.

According to Henggeler and Lee *"the persistence and the pervasiveness of behavioural disorders, as well as the complexity of causal variables involved, imposes a multidimensional approach which carries out interventions focused on the various contexts in which the subject lives (family, school, social environment). Therefore, the therapeutic model must aim to reduce risk factors and to reinforce protective factors, in order to decrease dysfunctional behaviours and to prevent the onset of anti-social behaviours"*(see Polidori et al., 2010, p. 179).

The authors suggest three levels of intervention: the first one must be focused on the family, aiming to implement abilities in educating, controlling, monitoring and supporting the child. Moreover, it is necessary to strengthen an effective communication style in the parents in order to reduce family conflicts.

The second level involves schools and in particular the teachers. Its purpose is to promote the integration of ADHD subject in a school environment, improving school results and facilitating a synergic communication among family members. The last level has to be addressed in an extra familial context and must aim to extend social relationships, self-control and affective modulation skills in the relationships with peers and adults. This should be supported by encouraging parents to understand the research of support in the social context in order to modify their reluctant and suspicious attitude.

Moreover, multimodal treatment also includes an individualized intervention on the patient based on psychoeducational, behavioural and cognitive-behavioural therapy techniques, as well as pharmacological support. This is especially so when a comorbidity of another disorders occurs. In summary, an effective multimodal approach includes the following components:

- a) behavior management training
- b) support for families
- c) special educational support at school
- d) medication, when appropriate

All of the above may not be necessary. The approach to treatment and management will depend on the severity of the condition, co-existing difficulties (e.g. language disorders), and the age of diagnosis.

### 4.1. Behaviour management training

---

The psychological and behavioural intervention is based on cognitive and metacognitive techniques, which are aimed at reducing impulsivity, controlling attention and organising personal activities.

Cognitive-behavioural therapy combines the teaching of cognitive strategies with techniques of behaviour modification such as reinforcements, self-reinforcements and modelling.

The aims of this intervention are to facilitate their thought processes and to increase self-monitoring in particular. There are trainings that can be employed to support this: a self-regulation training, based on verbal self-instructions, used to stimulate attention (selective, sustained, divided etc.); a social skills training which facilitates socially acceptable behaviours or interventions aiming to reinforce executive functions. When a comorbidity with other behavioural or learning disorders occurs, the intervention on ADHD should include a reduction of the symptoms as well.

#### *4.2. Support for families*

---

Supporting the family in creating a comfortable and peaceful environment in which the child can express himself and positively modelling his behaviour, has a key-role in the treatment of ADHD.

It's not unusual for parents to decide to undertake educative, coercive and punitive actions against their own children, as they are exasperated by the children's problematic behaviours. Very often, though, these strategies are ineffective, as they tend to reinforce bad habits. Offering specialist support becomes essential in order to help parents to understand the problem's nature, in organising timescales and ways and spaces that could allow the child to solve his problems. It is also important to build an environment which encourages self-regulation and reflection.

The Parent Training generally consists of a fixed series of 10-12 sessions in which disorder characteristics, family dynamics, communication and affective style used, possible conflicts between parents and educational incoherence are explored. Parents are taught to observe and monitor systematically the existing relationships between events causing inadequate and explosive behaviours and resulting situations that often contribute to maintain them (functional analysis). Moreover, the Parent Training aims to modify distorted thoughts and behaviours or excessive expectations, which don't contribute to the cognitive and behavioural change and the promotion of the child's wellbeing at home. Specific paper-based or electronic monitoring tools are employed in order to facilitate this task and to provide a methodical observation.

#### *4.3. Special educational support at school*

---

Within the multimodal approach, the cooperation with school and especially with teachers with an ADHD child in their class, aims to create a predictable environment that may help the child in his self-regulation process. Because of the characteristics of this disorder if the child acts in a chaotic and disorganized way he is unable to predict his actions, consequences and generally, does not reflect autonomously upon the effects of his own behaviour.

Similarly, he underestimates actual dangers and exhibits risky behaviours often involving himself or other people. So, a key role is played by the environment: the less it is organized and structured, lacking an explanation of the rules and of the consequences of the different behaviours the more it will contribute to an escalation of behavioural and learning difficulties.

Teacher training programs generally consist of some psychoeducational modules on the origin of the disorder, and some teaching the strategies that can be used in order to reduce problematic behaviours at school and those encouraging alternative or functional behaviours. The first modules can help teachers and other educational figures dealing with the ADHD child to understand that impulsivity, hyperactivity, unpredictability in reactions and behaviours that actually characterise the biologically determined disorder. Consequently, these manifestations require a specific management, adopting alternative strategies rather than punishments. The second modules aims to teach the behavioural and observation strategies in order to identify those situations that both introduce problematic behaviours and the consequences contributing to maintenance of them in the future. For the teacher, this process of analysis becomes essential to identify the purposes of problematic behaviour and for the planning of intervention strategies to improve the child's wellbeing at school.

#### 4.4. Medication

---

When the psychological or psycho-educational treatment is not enough to contain or modify clinical symptoms, or in case of an elevated neurobiological dysfunction, a pharmacological treatment can be required as well. The most commonly used drugs are methylphenidate (MPH) and atomoxetine (ATX), both considered the most effective.

According to Zuddas (2010) any pharmacological treatment with stimulants should be based on a comprehensive assessment and diagnosis including full medical history and physical examination to avoid common and unusual (but potentially severe) side effects. Besides, it must be part of a more wide intervention that includes psychological, behavioral, and educational advice.

The pharmacological compliance is an aspect to consider in patients with ADHD. In fact, not all of them accept and take their therapy regularly, sometimes compromising the outcomes of the multimodal treatment itself. A computerized system with interfaces between patient/family and doctor could help to verify the course and the adaptation of the treatment, as well as the effects of pharmacological therapy.

# ASSESSMENT

---

EDITED BY ALL PARTNERS COUNTRIES

## 1. The diagnostic process

---

The evaluation of a patient with ADHD is a long and complex process that consists of several phases: clinical interviews, medical examination, neuropsychological testing and behavioral assessment through questionnaires. The data obtained should be compared with each other and clinically interpreted within the history of the patient. This applies to children, adolescents and adults presenting with symptoms of ADHD.

If we think that a child with behavioral difficulties may have ADHD it is necessary to gather information from multiple sources (parents, teachers, educators) using semi-structured interviews and/or standardized questionnaires (rating scales) that investigate different aspects of behavior and social functioning and adaptive child. The international literature, in this sense, offers a variety of survey instruments that are described below.

### 1.1. Behavioral and Diagnostic Interview

---

The behavioural interview is one of the main tools used to cope with behavioural problems, especially in children and adolescents. It allows us to gather information on the general medical situation of the subject, while checking on the presence of other diseases and comorbidities and on the overall functioning of the problem behaviour in different contexts, such as home, school, etc. Moreover, this interview is a useful means to not only enhance the *therapeutic alliance* between clinician and patient (Ollendick & Greene, 1998), but also to involve parents and teachers in the assessment phase of treatment with the aim to create a supportive environment around the child.

The interview has been used in various research and clinical contexts. For example, it is a tool in many epidemiological surveys, but it is also commonly employed in clinical trials or in single-case studies, but also during the assessment phase in the clinical treatments.

The principal benefit of the interview with respect to other more structured tools (such as checklists and rating scales) is its flexibility. In fact, it can help the observation of the explicit and implicit attitudes of the interviewed, their verbal and nonverbal behaviours, and demonstrate how the behavioural patterns under examination are experienced by the various subjects involved.

In view of obtaining a more objective evaluation of the disease, more rigid tools have been designed, such as the *structured diagnostic interviews*. In this case, the interview is organized around some diagnostic criteria, for example DSM-IV or ICD-10, and the interviewer has to follow a well-defined route to explore the decisional tree and establish the diagnosis.

A clinician, a mental health professional or expressly trained professional generally conducts the behavioural interview. In the case of children a parent is often first to be interviewed usually it is with their mother. For ADHD child the parent interview is the main indirect assessment method; it is widely used to gather information about the child's behaviours and also to formulate diagnosis. However, the use of the behavioural interview can be extended to other adults also outside the family, principally teachers and caregivers. Finally the subject can be interviewed, alone or in presence of a parent, depending to the age and type of distress.

Ollendick and Green (1998) underlined that although the behavioural interview is addressed mainly in obtaining information, it can help parent and children to become more comfortable with the problem thanks to the activities of reflection, clarification and summary. Moreover, during an interview some issues can emerge that are not easy to notice with other indirect and direct observation tools. For example, the different perceptions of the problem between adults and child, especially in case of externalizing behaviours, or the real nature of the behaviour, i.e. if it is problematic or it is a result of unrealistic expectations of the parents.

Barkley and Edwards (2006, p. 241-2) listed the following purposes for the parental interview:

- to establish a relation between parent and the clinician
- to obtain information about the child and the family and, in particular, about the point of view of the parents about the child's problems
- to assess the grade of distress originated by the child's behaviour in the family life, evaluating also the psychological state of the parents
- to highlight specific events related to the manifestation of the problem
- to formulate diagnosis and design a therapeutic intervention
- as a form of "sheer catharsis"

As outlined before, the *structured diagnostic interview* is different. This tool evolved to address the issue of diagnostic disagreements and the consequence of the inconsistency in the use of the interviewing techniques by the diagnosticians leads to inconsistency in information obtained and lack of uniformity in the interpretation of symptoms recorded. To remedy these issues all structured diagnostic interviews use common techniques. In particular, the questions are specified in order to cover a well-established psychopathological area and anchors and definitions are provided explicitly in order to help the ratings of symptoms (Blanchard & Brown, 1998). The main properties to control in a diagnostic interview are the repeatability of the obtained diagnostic outcomes (*reliability* or *precision*) and an agreement between the outcome and the real situation of the subject, i.e. the *trueness* of the diagnosis. Together these two properties define the *accuracy* (or *validity*) of a measure. The *reliability*, related to the capacity of the diagnostic tool to identify true by false positive, can be estimated using the standard error of the difference score e.g. in a test-retest procedure or in inter-rater comparison (Margison et al, 2000). To assess the *trueness* is really difficult, in fact one should compare "the average of an infinite number of repeated measured quantity values and the reference quantity value" (JGCM 200, 2012), but this "reference quantity value" is generally unknown or approximated with the "gold standard", i.e. the best available value.

Therefore, the *validity*, or perhaps more precisely the *accuracy*, of diagnostic assessment tool can only be approximated, improving the specificity of information requested and using, for example, the LEAD (Longitudinal, Expert, and All Data) procedure proposed by Spitzer (1983). Typically, there is no information about this characteristic of the structured interview schedule.

In other sections of this report some of these tools are more suitable for ADHD diagnosis and we will briefly describe cascading information in the partner's country in relation to their use in different contexts (home and/or family).

## 1.2. Questionnaire or rating scales

---

Questionnaires and behavioral assessment scales are used to gather information on children with ADHD. The advantages are many: provide an overview of the quantity of problematic behaviors and are compiled in a short time which may suggest to the evaluators who read the list of behaviors and a rethinking of the problem. These questionnaires can investigate several psychiatric disorders or focus on specific psychiatric conditions.

The rating scales and checklists are very similar to the structured diagnostic interview and the main difference is in the understanding of the possible answers, often in yes/no or three-point severity scale. These scales are often used in many fields of social and psychological studies and can be designed to measure individuals or group characteristics. The distribution of these tools is increased due to the studies around their psychometric properties. These studies have managed to improve the scientific validity of them and to construct scales that are more focused and more accurate.

The behavior rating scales are tools to analyze and measure problem behavior in children, young people and also in adults. Generally, they are aimed at rating the overall status of the subject's behavior. But can be used for monitoring the efficacy of a treatment, or to guide the observation of a specific subject. Clearly, the scientific rigor demands have to be established in relation to the specific aim of the scale. Whoever uses the scale must be considered: in some cases the scale is designed for experts, clinicians or mental health professionals, but often, especially in ADHD world, the scales have to be used by laymen, such as parent and

teacher without any specific preparation or training. In this case, the scale must be simple to use, the scores simple to calculate, and the interpretation of the outcomes very clear.

The design of a diagnostic tool that is able to discriminate specific psychological diseases is a more complex process. In this case the reliability of the outcomes obtained by using standardized rating scales and validity are very important requirements.

Generally, a behavior rating scale is composed of a list of observable behaviors, or behavioral descriptions. Any item on this list, represents an observable behavior or a description of a behavioral manifestation that can be established in agreement with a teacher, parents and other people who know the child and involved in the intervention. The rater can use the list to indicate the presence of the particular item and in some cases also the frequency. The analysis of the responses can be used to obtain an overview of the child's functioning. As previously discussed, the two main problems of this procedure are the reliability and the validity of the scores. To mitigate these problems standardized scales will be used. These scales have the advantage of having been tested on a normal sample and produced standardised scores. The use of standard scores permits comparisons among different cohorts of children of the same age and gender.

In the following dedicated sections different rating scales useful for ADHD subjects will be discussed.

### *1.3. Objective clinical examination*

---

An objective clinical examination which if necessary can be combined with an instrumental one (EEG, TAC, NMR) and can be useful to confirm a diagnostic hypotheses to help evaluate the presence of other pathologies and any side effects of the pharmacological treatment.

### *1.4. Neuropsychological test for ADHD*

---

Neuropsychological tests are useful for the assessment of a child with ADHD because they allow you to define its characteristics in terms of attention, memory, executive functions and the strategies used. However they are not able to make a formal diagnosis as there isn't a test that is able to identify a 100% of the children with ADHD from those without the disease. The test is a tool to define the framework neuropsychological, not to make a diagnosis.

## **2. Classification of the assessment tools identified by the Partnership**

---

Starting from the consideration that behavior is a function of individual and environmental characteristics plus the interaction between them  $[B = F(P, E, P \times E)]$ , in this framework the different types of tools necessary to conduct a multidimensional functional assessment are listed according to the following classification:

1. Tools to assess individual characteristics in subjects with ADHD both in terms of pathological symptomatology and disorders commonly associated with ADHD (e.g., learning difficulties, anxiety, depression, self-esteem, sleep-wake problems, social adjustment, etc.). The code for this category is **P** (Person).
2. Tools to assess environmental characteristics associated with the management of ADHD both at school and home (e.g., parenting styles, parental stress, etc.). The code for this category is **E** (Environment).
3. Tools to assess directly the interaction between individuals with ADHD and their environment in which play a fundamental role the relationship with parents, teachers and peers (e.g., observation codes, methods of direct observation, daily report cards, etc.). The code for this category is **P x E**.

## 2.1. Tools embedded in category P

The **Conners Rating Scale - Revised** (CRS-R) (Conners, 1997) is one of the oldest and most widely used instruments to assess children with ADHD. The CRS-R (27–87 items, depending on the version; long and short versions are available) includes parent, teacher (CTR-S), and adolescent self-report behavioral ratings scales used to evaluate problem behavior experienced by children and adolescents. The parent and teacher rating scales are appropriate for youth ages 3–17 years, and the self-report measure is completed by adolescents of ages 12–17 years. The parent and teacher rating scales include the following subscales: Oppositional, Cognitive–Problems/Inattention, Hyperactivity, Anxiety–Shy, Perfectionism, Social Problems, Psychosomatic Concerns (parent scale only), Conner’s Global Index (including Restless–Impulsive and Emotional Liability), ADHD index, and DSM-IV Symptoms (including Inattentive, Hyperactive–Impulsive). Parents and teachers have to rate the frequency of behaviours described in each item in a 4-point Likert scale (0=never; 4=too often). The adolescent self-report (CASS:L) has includes the following subscales: Conduct, Cognitive, Family, Anger Control, Emotional Problems and Hyperactivity, ADHD index, and DSM-IV Symptoms.

The **MTA version of the Swanson, Nolan and Pelham questionnaire** (SNAP-IV) (Swanson et al., 2001) contains 26 items covering the core symptoms of ADHD and ODD specified in the DSM-IV (APA, 2000). It has subscales measuring hyperactivity/impulsivity (9 items), inattention (9 items) and ODD (8 items). For the teacher report version, Cronbach’s alphas of 0.92 for the inattention subscale, 0.96 for the hyperactivity/impulsivity subscale and 0.92 for the ODD subscale have been reported (Bussing et al., 2008). Inter-rater reliability between parent and teacher ratings were 0.49 (inatt), 0.43 (hyp/imp) and 0.47 (ODD) suggesting that parents and teachers may differ somewhat in their report of child behaviour on the SNAP-IV.

The **ADHD Rating Scale – IV** (Du Paul et al., 1998) is a parent and/or teacher rated measure of symptoms of ADHD in children aged 5–18 years. The measure includes 18 items subdivide in two subscales: Inattention (9 items) and Hyperactivity–Impulsivity (9 items). The scale help to obtain parent and/or teacher ratings regarding the frequency of each ADHD symptom based on DSM-IV criteria. Parents and/or teacher are asked to determine symptomatic frequency that describes the child’s home/school behaviour over the previous 6 months. The ADHD Rating Scale-IV is completed independently by the parent/teacher and scored by a clinician. The scale consists of 2 subscales: inattention (9 items) and hyperactivity-impulsivity (9 items).

The **Strengths and Difficulties Questionnaire** (SDQ) (Goodman, 1997; Goodman et al., 1998) is a brief behavioral screening questionnaire for children aged 3 – 16 years old. The scale have 25 items designed to gather information about the child’s emotional symptoms (5 items), conduct problems (5 items), hyperactivity or inattention (5 items), peer relationship problems (5 items), and pro-social behaviour (5 items). There are different versions for parents and teachers. Questionnaires for self-completion are available for adolescents aged 11 – 16 years old.

The manual and measure are available at <http://www.sdqinfo.org/>.

The **Child Behaviour Checklist** (CBCL) (Achenbach, 1991a; 1991b) is available in both teacher and parent report forms, consisting of 113 questions reporting on child behaviors in the past six months. These are scored on a three-point Likert scale (0=absent, 1= occurs sometimes, 2=occurs often). The 2001 CBCL revised version is structured around eight syndrome scales: 1) anxious/depressed, 2) depressed, 3) somatic complaints, 4) social problems, 5) thought problems, 6) attention problems, 7) rule-breaking and 8) aggressive behavior, grouped into two higher order factors–internalizing and externalizing behaviors. The CBCL revised scale includes six scales consistent with DSM diagnostic categories, namely affective problems, anxiety problems, somatic problems, ADHD, oppositional defiant problems, conduct problems.

Optional competence scales for activities, social relations, school and total competence are also available. The revised scales allow for multicultural norms where scale scores can be displayed in relation to different sets of



cultural/societal norms. Scales were also added for obsessive-compulsive disorder (OCD) and posttraumatic stress disorder (PTSD).

The **Vanderbilt ADHD Teacher and Parent Rating Scales (VARS)** (Wolraich et al., 1998) include both teacher (VADTRS) and parent (VADPRS) report versions. Both the CRS-R and the VAR include items measuring ODD and CD as well as a subscale for anxiety and depression, however the VARS includes items that assess school functioning and the VADPRS includes an analogous subscale to assess parents' perceptions of the child's school and social functioning. The VADTRS consists of 4 subscales relating to behaviour problems at school: Inattention, Hyperactivity/Impulsivity, Oppositional Defiant/Conduct Disorder and Anxiety/Depression and two measuring school functioning: Academic Performance and Behavioural Performance. The VADPRS includes these and two additional subscales of Inattention and Hyperactivity/Impulsivity (Wolraich et al. 2003). The frequency of behaviours are rated on a 4 point scale from never (0) to very often (3). In addition, the questionnaire includes a separate performance scale that rates functioning in the classroom including both social relationships with teachers and classmates as well as academic performance. This performance is rated on a scale of 1 to 5 from problematic (scored 1) to above average (scored 5).

The **Brown Attention-Deficit Disorder Scales for Children and Adolescents (BADDS)** (Brown, 2001) measures underlying concerns in executive functioning in ADHD that are not detected by DSM-IV checklists. It includes separate rating scales for children 3- 7 years, 8 – 12 years, and youths aged 12 – 18 years old. The items in each subdivision of the scale are carefully worded to reflect developmentally appropriate expressions of ADHD. Separate versions are available for teachers and parents rating the behaviours of children aged 3 – 7 years old. There is a separate self-report scale for children aged 8 – 12 years, while the adolescent's version can be completed as both a self-report measure and as a parent rates report. All 3 versions of the BADDS include 5 clinically derived subscales: 1) Organising, Prioritising and Activating to work, 2) Focusing, Sustaining and Shifting Attention to tasks, 3) Regulating, Alertness, Sustaining Effect and Processing Speed 4) Managing Frustrations and Modulating Emotions, and 5) Utilising Working Memory and Accessing Recall. The versions for 3 – 7 year olds and 8 – 12 year olds include an additional subscale: Monitoring and Self Regulating Action, producing a total inattention score for these subscales. The BADDS may uniquely detect nuances of ADHD that are not reflected in DSM-IV rating scales and is especially useful for assessing the inattentive form of ADHD.

The **Impairment Rating Scales (IRS)** (Fabiano, 2006) is a parent and teacher rating scale for assessing child functioning in domains such as academic performance, classroom functioning, family functioning, and relationships. Teachers/parents mark a visual analogue line representing a continuum of impairment from 0 (no problem/definitely does not need treatment) to 6 (extreme problem/definitely needs treatment) to indicate the child's impairment in each domain. The IRS was highly effective in discriminating between children with and without ADHD. There is evidence that the parent and teacher IRS identifying a unique variance beyond ratings of ADHD symptoms. The scale is brief, practical, and available in the public domain. It exists in both an English version and Italian version.

The teacher version of the **Disruptive Behavior Disorders Rating Scale (DBDRS)** (Pelham, Gnagy, Greenslade, & Milich, 1992) is an indirect rating scale measure of the disruptive behavior disorder symptoms of children. It allows parents to rate children in four subscales: Inattention, Hyperactivity/Impulsivity, ODD, and CD. The 45 items are rated on a 4-point scale ranging from 0 (not at all present) to 3 (very much present). The validity of the scale has been evidenced by its ability to discriminate between children with and without ADHD (Pelham, Fabiano, & Massetti, 2005).

The **School Situations Questionnaire (SSQ)** (Barkley, R., 1997) consist in a set of 12 questions to which teachers answer in a 9-point Likert scale according to the severity of the problem described in question

(1=mild; 9=severe). The SSQ evaluates the children's behaviour in terms of self-control and the maintenance of attention, allowing the exploration of the most problematic behaviours during typical situations of day-to-day school. The SSQ is reported as an important instrument that must be complemented with other of broader scope for the assessment of children with ADHD in schools.

The **Rutter Teacher Questionnaire** (Rutter, 1967) is a 26-item scale covering a variety of behavioural problems. The factors contain items representing hyperactivity/conduct (factor 1), anxiety/depressive (factor 2) and truancy/stealing (factor 3). The pattern of the items contained in factor 1 appears to be related with the category of hyperkinetic conduct disorder used by the International Classification of Diseases-10 so it can be a useful instrument for measuring children's behaviour problems.

The **Attention-Deficit Hyperactivity Disorder Evaluation Scale** (EDAH) Portuguese version (Lopes, 2009; Gomes, Lopes & Silva, 2010). The EDAH was developed by Farré and Narbona (2003) and consists of 20 items (close questions) to which teachers answer based on their observation of the child's behaviour during the last six months using a 4-point Likert scale. EDAH is structured in two sub-scales: hyperactivity/attention deficit and behavioural problems.

**Test of Everyday Attention for Children** (TEA-Ch) (Manly et al., 2001) is a battery of psychological tests for the assessments of attention in children. It can be used with children between the ages of 6 and 16 years old. It is a non-computerised measure that uses game like tests to assess three different forms of attention. It allows the comparison of a child's performance to the average performance of children their own age within age bands. The reliability and validity of the measure are established. There are 9 subtests in total and the TEA-Ch assess 3 different types of attention; Focused, Sustained and Controlling/Switching.

The **Scala per l'individuazione dei comportamenti di Disattenzione e Iperattività** (SDA I/G/B) (Marzocchi, Re & Cornoldi, 2010) is a Scale for Disorders of Attention deficit hyperactivity disorder for Teachers (SDAI) and Parents (SDAG) consist of 18 item, based on symptoms described by DSM-IV (APA, 1994) to which the teacher and/or parent must respond by giving an evaluation from 0 to 3 according to the frequency with which it occurs a behavior, (0 = never, 1 = sometimes, 2 = fairly often, 3 = very often). Both questionnaires are composed of two sub-scale, each consisting of 9 items: the odd numbers are relative to the size of inattention, and the items are equal relative to the size impulsivity - hyperactivity. The scoring of the score is very simple and fast, since the items describe symptomatic behaviors. You will get two separate scores, one for the inattention, obtained from the sum of the items odd, and one for hyperactivity/impulsivity, obtained from the sum of the items equal. The maximum score that a child can get is 27 for each sub-scale, in in different countries it is considered significant if a person scores equal to or greater than 14 in at least one of the two sub-scales.

The scale SDA also includes a version that can be used by the same child (SDAB), consisting of 14 items. The subject is asked to answer questions using a four-point Likert scale (0 = never, 1 = sometimes, 2 = fairly often, 3 = very often). The scale aims to identify problems from the child's point of view and to see if the evaluation corresponds to those of parents and teachers.

The **Scala per l'Identificazione Precoce del Disturbo da Deficit di Attenzione e Iperattività in età Prescolare** (IPPDAG/G)(Marcotto et al., 2002) is a scale for Early identification of Attention Deficit Disorder and hyperactivity for Teachers (IPPDAG) and Parents (IPPDAG). The instrument is administered to parents of children attending kindergarten in order to identify those with significant attention problems and hyperactivity. It consists of 24 items, some taken from questionnaires that already exist while others have been built from scratch, taking into account the criteria of DSM-IV in order to assess important aspects not investigated by questionnaires already present. The assessment is via a 4-level Likert scale (0 = never / not at all, 1 = little / sometimes, 2 = fairly often, 3 = very / always).

The **Questionario sindromi Compresenti** (COM) (Cornoldi, Molin, & Marcon, 2004) allows you to identify comorbidities with ADHD. The versions for parents and teachers is an observational questionnaire consisting of 30 items: 5 items Basic (or control) and 25 related to slightly maladaptive behaviors, communication difficulties, emotional and affective characteristics specific, grouped into 5 sub-scales, with the exclusion of an item. Teachers and parents are asked to complete the questionnaire only after carefully observed and for some time the children in different school situations. They are asked to assess the frequency or intensity with which the behaviors appear or skills described by the question, through a Likert scale, four intervals (0: never/not at all, 1: sometimes/a little, 2: often/enough; 3: Life/lot). The results obtained are scored on a syndromic picture of coexistence with conduct disorder, oppositional defiant disorder, pervasive developmental disorder high functioning/high-functioning autism, depression, anxiety and Tourette's disorder.

The **Scala per la valutazione dei Comportamenti Dirompenti** (SCOD-I) (Marzocchi et. al., 2001) is for the assessment of disruptive behaviors. The scale SCOD consist of 42 items, of which: 18 items ADHD (9 Silent. Hyperactive and 9), items 8 Oppositional Defiant Disorder, Conduct Disorder 16 items. The items are divided into 4 sub-scales, one for each size, so you can calculate 4 separate scores. It makes the evaluation of the frequency of behaviors (4-point Likert scale).

The **K-SADS-PL – Kiddie Schedule for Affective Disorder and Schizophrenia-Present and Lifetime version** (Kaufmann, 1997) is a diagnostic interview which aims to evaluate psychopathological disorders in children and adolescents, both in their past and in the present. It consists of a detailed and meticulous collection of the required symptoms to satisfy the diagnostic criteria according to DSM-IV and ICD-10. The above-mentioned interview has to be considered an integration and not a substitution of the clinical psychiatric assessment which is essential for making a diagnosis and a reliable prognosis. It is composed of:

- an introductory interview
- a diagnostic screening interview
- a supplement completion checklist
- five diagnostic supplements supporting the criteria expressed by DSM-IV (mood disorders, anxiety disorders, psychotic disorders, attention-deficit and hyperactivity disorders, alcohol/drugs abuse)
- a completion checklist of the patient clinical history
- a scale for child global assessment of functioning (GAF)

#### *2.1.1. Tests used for the neuropsychological and executive functions assessment in Italian context*

The **Matching Familiar Figures Test 20** (MFFT20) (Cairns & Cammock, 1978) has the purpose to evaluate two critical indexes relative to attentive process, impulsivity and accuracy. It consists of 20 items with a model-figure illustrated at the top of the page and other 6 similar figures placed below it. Only one among the 6 is identical to the model, the other 5 differ for some little details. The subject is invited to identify the one identical to the model from the 6 figures,. If the choice is correct, the examiner goes on with the following items. However if the child makes a wrong choice they will encourage the child to look for the right figure. After 5 attempts, if the child persists in making the error, he will be given the right answer and the examiner will go on with the next item. The recorded parameters are the total number of errors and child's first response time, the latter score is usually very low in impulsive children however the number of errors is often very high in those subjects that are unable to pay attention to details and use effective strategies to compare the various figures.

An Italian version of this test is included in the Batteria Italiana for ADHD (BIA) (Marzocchi, Re & Cornoldi, 2010).

The **Continuous Performance Test** (CPT) (Rosvold et al., 1956) is a neuropsychological test particularly indicated to measure the level of vigilance, impulsivity, and sustained and selective attention. The child is required to find a pre-set sequence of letters as quickly as possible.

This test has been calibrated on a sample of Italian children aged from 6 to 13 years (Marzocchi and Menazza, 1998).

The **Test delle Campanelle Modificato** (TCM) (Biancardi & Stoppa, 1997) (4-14 years). This is a quick barrage test of target stimuli. Matrices of stimuli have different levels of difficulty.

It evaluates the visual-spatial attention, the velocity and accuracy in the visual scanning and the strategies of perceptive analysis. The subject has to analyse four different sheets, each of them containing 35 bells and other figures representing animated and inanimate objects such as houses, trees, horses, fishes, etc. The test results in two different scores: a velocity score, relative to the mean number of bells found by the child, and an accuracy score which reports the average and the standard deviation of the number of bells.

The **Stroop Test** (Stroop, 1935) enables to examine the processes of selective attention and inhibition of incongruent information. The subject is required to read some words indicating colours names and to name the colour in which they are written (e.g. if the word to read is “green” but the colour of the stimulus is blue, the subject has to answer “blue”).

The **Tower of London Test** (TOL) (Pennington & Ozonoff, 1996) is a very effective test for children aged 4 to 13 years. It is employed to explore some dysfunctional areas such as deficit in planning, strategic decision and problem solving, all of them associated to ADHD. The subjects are required to stack beads of various colours (one red, one green and one blue) on three pegs with different heights, in order to obtain the same configuration indicated from the examiner using a fixed number of moves.

The **Wisconsin Card Sorting Task** (WCST) (Heaton et al., 1993) is a classification task based on variable rules. It is used to assess the flexibility in choices of problem-solving strategies and the incapacity of abstraction and perseveration, typical features of ADHD. The WCST is considered a measure of executive functions connected to the bilateral activation of the dorsolateral prefrontal cortex; low test performances lead to a hypothesis of association between ADHD and the dorsolateral prefrontal cortex.

### *2.1.2. Scales used for the assessment of comorbidity with specific learning disorders in Italian context*

The reading abilities are evaluated with the following batteries:

- **Reading tests MT** for primary school-2 (Cornoldi & Colpo, 1998)
- **New reading tests MT** for lower secondary school (Cornoldi & Colpo, 1995)
- **Advanced MT tests of reading comprehension and mathematic** for the two-year period in upper secondary school (Cornoldi, Pra Baldi & Friso, 2010)

These tests consist of some readings divided for level of difficulty and periods of time. The purpose is to assess accuracy and fluency in reading text, considering them the most appropriate measure to describe the reading skill required in various life contexts and at school. The subject is asked to read a narrative and an informative text and subsequently to answer some multiple-choice questions, specifically constructed to evaluate the different aspects involved in a written text comprehension. Mt tests are standardized tasks that enable the examiner to assess the comprehension skill of the subject, compared to a baseline normative sample.

The **Batteria per la Valutazione della scrittura e della competenza ortografica** for primary and secondary school (Tressoldi & Cornoldi, 1991). Through the use of text dictation, reading speed and writing this battery of tests verifies the ability to automatically follow rules and conventions of Italian language. Errors are classified by their number and type: phonological (use of wrong graphemes, omissions, etc.), not phonological (fusions, separations and homophones) and other errors such as geminate consonants and accents. The quality of handwriting is evaluated as well.

The **Batteria per la valutazione della Dislessia e della Disortografia Evolutiva** (DDE-2) for the assessment of dyslexia and dysgraphia (Sartori, Job & Tressoldi, 2007). The subject has to read aloud four lists of high-

and low-frequency words, with the purpose to verify accuracy and speed of lexical access; other three lists of 'nonwords' are used to verify the phonological access to reading, in order to identify the associated type of dyslexia. Moreover, the battery includes the assessment of writing and homophones in both reading and writing.

The **Test di Valutazione delle Abilità di Calcolo- Gruppo MT (AC-MT)** (Cornoldi, Lucangeli & Bellina, 2002; Cornoldi & Cazzola, 2000). This test can be administered from the first class of primary school to the third of secondary school. Two tests are administered: an individual and a group test. In the latter, a distinction between the calculation area and the numerical knowledge occurs. The calculation process in the four basic operations (at secondary school also arithmetic expressions) and syntactic and semantic knowledge of maths mechanisms (identification of positional value of numbers, quantity concept, written numbers transformations, implicit calculation, etc.) are evaluated from a quantitative and qualitative point of view. In order to verify accuracy and speed of mental calculation chronometer is used in the individual part of the test a.

The test of **Abilità di Calcolo Aritmetico (ABCA)** (Lucangeli, Fiore, Tressoldi, 1998) for mathematics knowledge and skills. The test is directed to children attending the third, fourth and fifth classes of primary school. It consists of one-hour individual administration and is a useful tool to assess the efficiency of the main parts of cognitive elaboration of numbers and calculation system.

### 2.1.3. Scales used for the Intelligence evaluation in Italian context

The **Wechsler Intelligence scale for Children (WISC-III)** (Wechsler, 1991) is the most famous international scale for the evaluation of intelligence in children between the ages of 6 and 16 years and 11 months. Subtests have been selected to evaluate the various mental skills, globally indicating the child's general intellectual ability. Three scores generate from the administration of the test, indicating an evaluation of intellectual abilities:

- *Verbal IQ (VIQ)*: resulting from the sum of weighted scores of verbal subtests;
- *Performance IQ (PIQ)*: resulting from the sum of weighted scores in performance subtests;
- *Full Scale IQ (FSIQ)*: resulting from the combination of verbal and performance subtests scores; In addition, four other composite scores can be obtained: Verbal Comprehension index (VCI), Perceptual Reasoning Index (PRI), Processing Speed Index (PSI) and Working Memory Index (WMI).

The *WISC-III* includes the following 12 subtests (6 verbal and 6 performance subtests), administered alternately:

- *Information*: general knowledge questions about events or common objects.
- *Similarities*: similarities between two items must be explained in a series of words pairs, in order to verify logic and categorization skills.
- *Arithmetic comprehension*: mental solving of arithmetic problems.
- *Vocabulary*: the child is asked to define a sequence of words verbally presented, with the purpose to assess language functions and variety of well-known terms.
- *Comprehension*: questions requiring a solution to practical problems.
- *Digit span*: the subject is asked to repeat strings of digits in the same or in reverse order. This task explores the working memory.
- *Picture completion*: the child is asked to complete coloured figures with missing details.
- *Coding*: shapes and numbers that the child has to associate to a series of symbols. - *Picture arrangement*: the child is asked to arrange pictures in order to tell a story.
- *Block design*: this task entails the creation of geometric figures using some blocks.
- *Object assembly*: the child is asked to put together pieces in order to construct an image.
- *Symbol search*: children are given rows of symbols and target symbols, and asked to mark whether or not the target symbols appear in each row.

- *Mazes*: the subject is asked to solve mazes puzzles of increasing difficulty in order to verify the ability of visual-spatial planning.

The Raven's **Progressive Matrices** (Raven, 1989) were developed with the purpose to verify mental ability. This test can be administered to people of all ages and educational level.

The subject is asked to choose, among 6 or 8 pictures, the element that completes the model given. The tasks require the subject to analyse, construct and integrate a series of concepts. Depending on the subject's age (from 3 to 11 years and 6 months), the *CPM (Coloured Progressive Matrices)* can be used. The *global scale* includes 36 items and aims to measure the development of cognitive functions before the reaching maturity. From 12 years onwards the coloured *SPM- Standard progressive Matrices* can be used. They consist of 60 items divided in 5 sets of 12 items each, becoming increasingly difficult.

The **Leiter International Performance Scale-Revised** (Leiter-R) (Leiter, 1979; Levine, 1982) provides a nonverbal measure of intelligence apart from educational, social and linguistic influences. These characteristics make the scale particularly suitable for subjects with severe cognitive deficits. It consists of 2 separately administered batteries (Visualization and Reasoning, Attention and Memory) and of four level scales (for the examiner, parents, teacher and self) which provide a multidimensional assessment of the subject's behaviour.

#### 2.1.4. Scales used for the assessment of social skills

The **Social Skills Rating System** (SSRS) (Gresham & Elliott, 1990) is a widely used questionnaire measuring children's social competence in pre-school, elementary and secondary students as observed by the child itself, parents and teachers aged 3-18 with or without disabilities. Parent and teacher and child report forms are available.

The common factor underlining the three versions of the SSRS are: "Cooperation", "Assertion" and "Selfcontrol". The parent version includes the "Responsibility" factor and the child version contains a further factor named "Empathy". The SSRS provides three measurement areas: Social Skills, Problem Behaviours, and Academic Competence can be administered separately.

The SSRS administration can be completed in 15-25 minutes, but it depends on the number of rating scales employed. Each questionnaire contains items with a 3 point scale (for instance, 0 = Never, 1 = Sometimes, 2 = Very Often) describing the student typical behavior.

SSRS is sold by Pearson and it provides separate norms for boys and girls.

Van der Oord (Van der Oord et al., 2005) assessed the psychometric properties of the SSRS when used with ADHD students. Only the SSRS-teacher version replicated the original factor structure; SSRS-parent version supports 3 of 4 scales and the child version yielded only two factors. Authors found also evidence that SSRS can be used to discriminate between normal controls and children with ADHD.

The **Student Skill Checklist** (Sprafkin et al., 2002) is a questionnaire, which helps to identify student's social skills using a score from 1 (almost never) to 5 (almost always). The score establishes the severity level and the urgency of an intervention request. After the administration of the above-mentioned questionnaire, sixty didactic units for the development of relational and communication skills are proposed. These units are specifically constructed for students with a social problematic behaviour and can represent the starting point for an educational intervention that can be administered individually, in small groups or to the entire class.

The **Means-End problem Solving Test** (MEPS) (Shure and Spivak, 1972) evaluates the capacity to develop increasingly articulate and elaborate solutions, in order to solve the specific interpersonal problem given. The examiner reads short texts about social issues such as making friends, managing frustration and conflicts in interpersonal relationships. The purpose is to assess if the child is able to manage his problems. A specific training focused on the lacking skills is proposed after the test.

### 2.1.5. Scales used for the assessment of attributional and self-perception style

The **Questionario di Attribuzione** (Cornoldi et al., 1996). The subject is required to answer 10 multiple choice questions that analyse the *locus of control* of the child when facing problematic situations.

The **Self-Perception Profile for Children** (Harter, 1985) is aimed to evaluate the perception of children on the ages 8 to 15 in the following domains:

- Scholastic competence
- Social competence
- Athletic competence
- Physical competence
- Behavioral conduct
- Global self-worth

The Self-Perception Profile for Children provides 36 questions with a structured alternative format in which the child is asked to decide which option is truer for him/her and then he/she has to grade how strong the statement of true is for him/her.

The scale also includes a teacher rating scale. The teacher rate the child's actual behavior in five specific domains and it consists of 15 questions.

The **Self-Perception Profile for Adolescents** (Harter, 1985) is an extension of the Self-Perception Profile for Children, including new subscale more specific for the adolescence.

In particular, the Self-Perception Profile for Adolescents aims to evaluate the following domains:

- Scholastic Competence
- Social Competence
- Athletic Competence
- Physical Appearance
- Job Competence
- Romantic Appeal
- Behavioral Conduct
- Close Friendship
- Global self-worth

The scale consists of 45 items with the same question format, administration rules and scoring criteria of the children's version. The Self-Perception Profile for Adolescents includes a 16 point teacher rating scale.

The **Social Adjustment Inventory** (SAICA) (John, Gammon, Prusoff, & Warner, 1987) is a parent-report questionnaire containing 77 questions measuring social behavior at school, home, during the child's spare time and during interaction with peers, siblings and parents. The SAICA is intended to evaluate the social adjustment of children in school age, defined as "the interplay between the individual and the environment" (p. 898). It could be administered as a self-report tool for children or filled in by parents.

The SAICA can be used to assess the children's functioning in the current scholastic year as well as in previous ones.

It consists of 77 questions of which 35 are focused on "competence" with a 4 point scale ranging from "very, not at all competent" to "involved in the activity". The remaining 42 questions about "problem-behavior" are scored from "not at all problem" to "severe problem for the child". The SAICA needs almost half an hour to administer.

A factorial analysis will comment on 3 factors: task performance, spare time sociability, and family relations. The reliability of the SAICA is acceptable. The construct validity is supported by the authors' analysis and its convergent validity is good.

### 2.1.6. Scales used for differential diagnosis or comorbidity assessment

The **Multidimensional Anxiety Scale for Children (MASC)** (March, 1997) consist of 39 items which cover four major factors, three of them include two sub-factors: (1) physical symptoms (tense/restless and somatic/autonomic), (2) social anxiety (humiliation/rejection and public performance fears), (3) harm avoidance (perfectionism and anxious coping), and (4) separation anxiety. The MASC factor structure is invariant across gender and age and shows excellent internal reliability.

The **Children Depression Inventory (CDI)** (Kovacs, 1994) is a 27-question scale that explores the symptoms and the consequences of depression in children (negative mood, anhedonia, negative self-esteem, interpersonal problems, poor school performances). Each item has a score from 0 to 2 (never, sometimes, often, always). The validity of this scale is controversial, even though its author highlights the existence of a relationship between the diagnosis of depression and the scoring obtained. The score varies from 0 to 54, and it is assumed that a score over 18 suggests a mood disorder (other authors suggest over 21).

The questionnaire **Scale psichiatriche di Autovalutazione per Fanciulli e Adolescenti (SAFA)** (Cianchetti & Sannio-Fancello, 2001) is a useful tool to evaluate the psychological condition of children and adolescents. The questionnaire consists of 6 scales that aim to assess individual anxiety symptoms (SAFAA), depression (SAFA-D), obsessive-compulsive disorder (SAFA-O), psychogenic eating disorder (SAFAP), hypochondria and somatic symptoms (SAFA-S) and phobic symptoms (SAFA-F). There are two versions of each scale: one for subjects aged 8-10 (indicated with letter “e”) and one for those aged 11-18 (indicated with letters “m-s”), with the exception of the anxiety scale, which offers three versions.

### 2.1.7. Computerized tests of attention

The **Intermediate Visual and Auditory Continuous Performance Test (IVA)**(Sandford & Turner, 1995) is a 13 minute, visual and auditory performance task. It is designed to assess, response control and attention and provides an objective measure of fine motor hyperactivity.

The **Test of Variables of Attention (T.O.V.A)**(Greenberg & Waldman, 2006) is a 23 minute (11 minutes for 4 – 5 year olds), non-language based, fixed interval, visual performance test for use in screening, diagnosis and monitoring of children with attention deficits.

The **Software Autoregolare l’attenzione** (Marzocchi, Portolan,& Usilla, 2013) is a multimedia program aimed at subjects aged 8-12 and is intended to offer ways to practice attention and concentration. The program includes about 50 different activities aiming to develop vigilance level, inhibition, working memory, as well as interference control and cognitive flexibility. A preliminary test is included in order to verify starting skills. Both the teacher and the caregiver are able to monitor child’s results using a management area in which correct answers and errors can be verified.

The **Test Attenzione e Concentrazione – 7 test e 12 training di potenziamento** (Di Nuovo, 2000) is a software that is designed to measure, recover and reinforce the attention and concentration components. The program is composed of a questionnaire with 7 tasks for the assessment of cognitive and perceptual components, and another, which contains reinforcement exercises, characterised by a playful and progressive approach.

## 2.2. Tools embedded in category E

---

The **Parent-Child Relationship Questionnaire** (Furman & Giberson, 1995). A 40-item questionnaire articulated in five overarching factors (a) Personal Relationship—companionship and intimacy (e.g., “How often do you and this child do nice things for each other?”); (b) Warmth—nurturing and affection (e.g.,



“How often do you feel proud of this child?”); (c) Disciplinary Warmth—praise, prosocial behaviors, and shared decision making (e.g., “How often do you tell your child that he or she did a good job?”); (d) Power Assertion—quarreling and forceful punishment (e.g., “How often do you yell at this child for being bad?”); and (5) Possessiveness—control and protectiveness (e.g., “How much do you want this child to be around you all of the time?”). Respondents use a 5-point Likert scale.

The **Child Health Questionnaire 4 (CHQ-PF50)** (Landgraf et al., 1999) is a questionnaire organized in two physical and psychosocial domains. It allows parents to evaluate the well-being and state of health of children and self-evaluate how the severity of a disorder impacts on their emotional state, time management, family cohesion. The Physical dimensions are: physical functioning (PF), effect of physical health on social relationships (RP), bodily pain/discomfort (BP), general health perception (GH). The Psychosocial domains are: effect of emotional-behavioral problems on social relationship (REB), self-esteem (SE), mental health (MH), general behavior (BE), emotional impact on parent (PTE), and time impact on parents (PTT). A final domain reveals the level of restriction on family activities and cohesion.

The **Family Environment Scale (FES)** (Moos & Moos, 1981) is used to describe the family environment in terms of three underlying dimensions: Family Relationship, Personal Growth, System Maintenance and Change. Three forms allow us to measure the family climate in real, ideal and expected form.

The **McMaster Family Assessment Device (FAD)** (Epstein et al., 1983). The Family Assessment Device is a questionnaire that reveals the overall level of family function using the seven dimensions of McMaster Family functioning model: Problem Solving, Communication, Roles, Affective Responsiveness, affective Involvement, Behavior Control, General Functioning. It is composed by 60-statements each of them assigned only to one dimension. Each dimension includes between 7 to 12 statements. Each family member over the age of 12 evaluates his or her level of agreement among 4-point Likert scale: strongly agree, agree, disagree, strongly and disagree. It requires 15 to 20 minutes to complete. The general functioning scale has been demonstrated have excellent psychometric properties (Byles et al., 1988) as a brief measurement tool of overall family functioning.

The **Five Minute Speech Sample (FMSS)** (Daley, Sonuga-Barke, & Thompson, 2003) provides a good proxy measure of the parent-child relationship. Parents are asked to talk freely about their thoughts and feelings towards their child and the relationship that they have with their child for five minutes. Speech samples are recorded and later rated on global scales of warmth, relationship and initial statement and frequency counts of positive and negative comments. High parental EE is indicated by the presence of a negative rating on one of the global scales or a higher number of negative comments than positive comments.

The **Alabama Parenting Questionnaire** (Frick, 1991) includes 35 questions to assess some important dimensions which could be directly involved in the conduct problems and delinquency in youth: Positive Reinforcement, Parental Involvement, Poor monitoring and Supervision, Inconsistent Discipline and Corporal Punishment. Different versions are available: Child Global Report, Parent Global Report, Child Telephone Interview, and Parent Telephone Interview. Researchers can download and use the APQ free of charge in their research activity (<http://psyc.uno.edu/Frick%20Lab/APQ.html>).

The **Parenting Sense of Competency Scale (PSOC)** (Johnston & Mash, 1989) is one of the most frequently used measures of parenting efficacy (Jones & Prinz, 2005). The PSOC contains two subscales measuring parenting efficacy (how competent and capable parents feel in the parenting role; 7 items) and satisfaction (how motivated do parents feel in their parenting role; 9 items).

The **Family Strain Index (FSI)** (Riley et al., 2006) is a short 6 item questionnaire that measures the impact of having a child with ADHD on the family experience. Parents are asked to rate the frequency of occurrence of

each item over the past four weeks on a 5-point scale (0= never, 1= almost never, 2= sometimes, 3= almost always, and 4= always).

The 12-item **General Health Questionnaire** (GHQ-12) (Goldberg & Williams, 1988) provides a brief self-report measure of common mental health problems that can be used to measure parental well-being. A study comparing the proposed factor structures favours the GHQ-12 as a one-factor scale measuring psychological distress with an emphasis on depressive symptoms (Romppel et al., 2012).

The **Parent Stress Index (PSI)** (Abidin, 1995) is a screening and diagnostic measure. The assumption is that both child and parent characteristics contribute to stress in the interaction. It is used to assess parental stress due to parent characteristics, child characteristics, and their interactions.

The PSI identifies 3 main domains of stressors: 1. Parental distress (PD) (assesses the level of distress that a parent is experiencing in his parental role, resulting from personal factors directly related to that role); 2. Interaction parent - child dysfunctional (P-CDI) (indicating the degree of perception that a parent has that the child is not meeting their expectations and interactions with the child who does not strengthen it as a parent wishes). There are two forms of self-report questionnaire, the full version and the short one. Its aim is to investigate the general stress of the parent in relation to the characteristics of the child, the specific situation of the complexity of management, the specific anxious responses to the exercise of the parental role of the parent and the parent-child relationship. In the short version you will get some indices converted into percentiles related to parental distress (anxiety, discomfort, negative coping, stressful life events, etc.), parent-child dysfunctional interaction, characteristics of the Difficult Child, and a general index of Total Stress.

The version of Abidin & Santos (2003) includes 108 questions distributed between two domains: parent's domain and child's domain. The parent's domain evaluates the parents personal characteristics and variables from the familiar context that have impact in the parent's capacity to deal with tasks and requirements from parental actions:

- sense of competence
- attachment
- role restriction
- depression
- relation husband/wife
- social isolation - health

The child's domain assesses the child's characteristics and the manner which parents perceive the consequences of their child's characteristics on themselves:

- distraction/hyperactivity
- reinforcement to parents
- humour
- acceptance
- adaptation
- autonomy

The **Senso di competenza dei genitori** (Vio et al., 1999) is a self-assessment questionnaire that explores, through a Likert scale from 1 to 6, the perception of the parent's self respect to the kind of effectiveness in the use of strategies and the sense of satisfaction that you have with respect to the parental role.

The **Parenting Scale** (PS) (Arnold et al., 1993) is a measure of parents' style in discipline situations. It uses three dimensions: Laxness (permissive discipline); Over-reactivity (authoritarian discipline, displays of anger, meanness, and irritability); and Verbosity (overly long reprimands or reliance on talking). It is a self-report that consists of 30-questions, on a 7-point Likert scale where 7 indicates a high probability of making the discipline mistake and 1 indicates a high probability of using an effective, alternative discipline strategy. The internal consistency and reliability of the measure is adequate. Higher scores indicate more effective discipline style.

The **Parent Problem Checklist** (Dadds & Powell, 1991) is a checklist that measures parental disagreement regarding the education of children, i.e. the ability to cooperate in family management. It consists of 16 questions and provides an index of disagreement (disagreement) of parents about the discipline of their children.

The **Egna Minnen Beträffande Uppfostran** (EMBU-P) (Perris et al., 1980, revised by Castro, Pablo, Gómez et al., 1997). The EMBU examines parents perceptions about their own educative practices concerning their child. It includes the evaluation of: (1) emotional support; (2) rejection; (3) and control.

The **School Situations Questionnaire** (SSQ) (Barkley & Edelbrock., 1987) consist of a set of 12 questions which teachers answer in a 9-point Likert scale according to the severity of the problem described in question (1=mild; 9=severe). The SSQ evaluates the children's behaviour in terms of self-control and the maintenance of attention, allowing the exploration of the most problematic behaviours during typical situations of day-to-day school. The SSQ is reported as an important instrument that must be completed with other instruments of broader scope for the assessment of children with ADHD in schools.

The **Social Support Satisfaction Scale** (Ribeiro, 1999) evaluates the individuals' satisfaction with social support. It includes the evaluation of: (1) satisfaction with friends; (2) satisfaction with intimacy; (3) satisfaction with family; (4) satisfaction with social activities.

The **Life Experiences Survey** (Sarason, Johnson e Siegel, 1978) evaluates the stress through life events that happened in the last year, the desirability of these events and the intensity of their impact perceived by the individual.

The **Parenting Styles Inventory** (Gomide, 2006) evaluates practices used by parents in their child's education that can lead to the development of anti-social or pro-social behaviors. It includes the following sub-scales: (1) positive monitoring; (2) moral behavior; (3) negligence; (4) inconsistent punishment; (5) relaxed discipline; (6) negative monitoring; (7) physical abuse.

The **Adult-Adolescent Parenting Inventory** (AAPI-2) (Bavolek & Keene, 1999). Answers to this questionnaire allow the identification of a risk index for behaviors and practices of maltreatment and negligence in 5 different scales: (i) inappropriate expectations; (ii) lack of empathy, (iii) Physical punishment; (iv) role inversion; (v) Autonomy.

The **Knowledge about Attention Deficit Disorder Questionnaire** (KADD-Q) (Sciutto et al., 2000) is a 41-item rating scale aimed at measuring teachers' knowledge and misperceptions of ADHD in three specific areas: symptoms/diagnosis of ADHD, general knowledge about the nature, causes and outcome of ADHD and possible interventions with regard to ADHD. Correct, don't know, and incorrect responses to the questions indicated, respectively, knowledge, a lack of knowledge and misperceptions concerning ADHD.

The **Student-Teacher Tension Checklist** (STTC) (Greene, Marchant, & Beszterczey, 1997) lists DSM-IV behaviours for ADHD and ODD. Teachers are asked to indicate the extent to which these behaviours frustrate them on a scale from 1 (the behaviour causes no tension or frustration) to 5 (the behaviour causes extreme tension or frustration).

The **Index of Teaching Stress** (Greene et al., 1997) was originally developed to be a teacher version of the Parenting Stress Index. Teachers respond to the questions about a target child. The questionnaire contains two parts: Part A lists common child behavior problems, teachers are asked to frequency of behaviors for a particular child and Part B of the questionnaire asks teachers about the impact of a student's behavior on teaching efficacy and satisfaction in their teaching role (ibidem). This may therefore provide a useful measure of the teacher-child relationship.

### 2.3. Tools embedded in category P x E

---

Objective classroom observations may provide the most reliable measure of child behavior in the classroom, since teacher report of behavior may be subject to ‘halo effects’ (Lauth et al., 2006). Over the past decade, systematic observation codes have been developed and psychometrically tested to identify the specific classroom behaviors that distinguish students with ADHD from their same-aged peers without ADHD (Abikoff et al., 2002; Platzman et al., 1992; Skansgaard & Burns, 1998).

Generally, the child’s behavior is observed across settings (e.g., classroom and playground) on several occasions to establish the frequency and/or duration of various target behaviors. Behavioral frequencies are usually compared to those displayed by several of the student’s classmates to determine the deviance of the referred child’s behavior.

The direct observation codes used most widely are:

The **Classroom Observation Code (COC)** (Abikoff & Gittelman, 1985) provides behavioral categories for assessing children during academic tasks in the classroom and was used in the Abikoff (2002) study described above. The code measures childrens behavioral dimensions including distracting others, distracting teachers, verbal aggression and inappropriate motor movements. The behavioral categories of the COC have been shown to differentiate elementary school-aged “hyperkinetic” youngsters and normal children (Abikoff et al., 1977, 1980).

The COC assesses the appearance of 12 mutually independent behaviors during structured academic work time:

- interference (e.g., clowning, interrupting others, talking during work)
- interference to teacher (e.g., interrupting teacher)
- off-task (sustained inattention or distractibility)
- noncompliance (not complying with teacher requests or instructions)
- aggression (physical aggression or destruction of property)
- verbal aggression to children (e.g., name calling, taunting, teasing)
- verbal aggression to teacher (e.g., name calling, arguing)
- minor motor movement (inseat buttock or rocking movements)
- gross motor – standing (getting up from seat without permission)
- gross motor - vigorous (e.g., running, skipping)
- out-of-chair (extended time out of seat)
- solicitation (e.g., going up to teacher, calling out to teacher)
- A 13th category, absence of behavior, is scored if none of the code categories occurs during an observational interval.

For most categories, a modified time-sampling strategy is used such that only the first occurrence of the behavior in the 15-s interval is scored. For other categories (off-task, noncompliance, out-of-chair), a timed criterion is required and the behavior is scored if it occurs throughout the entire 15-s interval.

The **Behavioral Observation of Students in Schools (BOSS)** (Shapiro, 1996) is an observational code aimed at assess two categories of engagement, active engaged time (AET) and passive engaged time (PET) and three categories of non-engagement: off-task motor (OFT-M), off-task verbal (OFT-V), Off task (OFTP). An additional category is included to evaluate the type of instructional setting (e.g. student during independent seatwork, teacher in small group not including target student). The difference between active and passive is explained clearly in the study of Junode and colleagues (Junode, DuPaul, Jitendra, Volpe & Cleary, 2006, p. 92): “*active engagement is defined as those times when a student is actively attending and responding to a true academic task (i.e., writing, reading aloud, talking to a teacher or peer about the academic material), while passive engagement is defined as those times when the student is passively attending to assigned academic work (i.e., listening to a lecture, looking at a worksheet, silently reading a book)*”.

The frequency of two classes of on-task behavior were recorded and then converted to rates for each participant: active engaged time (AET) and passive engaged time (PET). The period of each observation interval is 15 min and is divided into 60 intervals, each of which was 15-s in length; the frequency of AET and PET is collected utilizing a momentary time sampling procedure at the beginning of each 15-s interval. OFT behaviors are coded utilizing a partial interval recording schedule, where the occurrence of each behavior was recorded only once during each interval.

The **Behavior Assessment System for Children (BASC)** (Reynolds & Kamphaus, 1998) is a multidimensional assessment tool aimed at measure many aspects of maladaptive and adaptive behaviors from positive peer interaction to repetitive motor movements, in children aged two and half years and 18. It includes five main components: Structured Developmental History, Parent Rating Scale, Teacher Rating Scale, Self Report of Personality and Student Observation System (SOS). Each of them can be used separately or in combination. Regarding the observation methodology is possible to code and record direct observations of a child's behavior using a momentary time sampling procedure.

This tool is particularly useful in the clinical contexts and research situations. It can also be used for the direct observation portion of a Functional Behavioral Assessment.

The **School Hybrid Observation Code for Kids (SHOCK)** (Volpe & Lorah, 2000) mix two well-known observation codes: the ADHS SOC di Gadow et al. (1996) and the famous BOSS of Shapiro (1996) above described. For a detailed description of the methodology see DuPaul and Stoner (2003).

In order to formulate precise and effective academic interventions a variety of others coding schemes are available in literature (Volpe et al., 2005).

**Peer sociometric methods** aim to evaluate the relationships of a person in the “reference group” (for instance the classroom). Jacob Moreno (1934) is commonly considered as the founder of these methods at the beginning of the 20th century.

A large variety of peer sociometric methods exist such as peer nomination, peer rating, peer ranking, and alternative procedures. These instruments are procedures with high levels of reliability and validity and they represent powerful predictors of future social outcome.

The methods described by Coie (Coie et al., 1982) and Newcomb and Bucowski (1983) are the most used by researchers.

In the Coie (ibidem) methodology, researchers ask the reference group the following questions: "What three children in this classroom do you like the most?" and "What three children in this room do you like the least?" The gathered raw data is standardized in z-scores so at to calculate the “social preference” and the “social impact” of each person of the reference group. 5 categories of social relationship can be identified through this method, as described in the following table:

	Liked	Disliked
Popular	By many	By few
Rejected	By few	By many
Neglected	-	-
Controversial	By some	By others
Average status	Around the mean	Around the mean

Newcomb and Bucowski (ibidem) ask people to “*nominate the three same-sex, same-grade peers who were their best friends and the three who they least wanted to play with*” (pp. 858). They use a probabilistic criteria to identify levels of acceptance and rejection, comparing the number of nominations obtained by a children with the value attended by chance.

The **Functional Assessment Checklist for Teachers (F.A.C.T)**(March, Horner, Lewis-Palmer, Brown, Crone, Todd, & Carr, 2000) is an interview tool designed for school personnel to build behavior and support plans for students. The F.A.C.T is intended to be an efficient strategy for initial functional behavioral assessment. The F.A.C.T is completed by teachers, clinicians and parents that are then used to either build behavior support plans or to guide more complete functional assessment efforts.

The **Standardized ADHD School Observation Form** adapted from Jim Wright's school observation for ADHD recommendations is a short format behavioral observation record that allows teachers to track and monitor the behaviour of a target student in a given observation period (Wright, 2002). The target behaviour recorded are; Off-Task (inability to focus attention on school work during academic periods), Not finishing (inability to finished assigned class work), Out of seated (inability to remain seated during academic periods), Calling out (calling out or inappropriate verbalizations, e.g., nonsense noises), Repetitive/motor (repetitive motor behaviour e.g., table-tapping or playing with objects), Compliance (Non-complied with reasonable adult requests). The tool is used to formulate targeted behaviour support plans or to guide formal functional behavioral assessments.

The **Daily Behavior Report Cards (DBRC)** is a common tool used to collect information about student behaviors over a specific period of time. DBRC is often based on a Likert rating collected in a specific time interval. As assessment tool DBRC can be used to study the effect of an intervention and at the same time also as behavioral self-monitoring tool. Wright (2002, Appendix D p. 1) highlight the feature of the standardized version of the tools where *“individual behavioral items can be consolidated into larger “response classes,” or broad groupings, made up of behavioral items that co-vary”*. As a consequence in the field of ADHD the ADHD Daily Behavior Rating Report Card allow the teacher to rate six single items that can be consolidated in the two major response-classes: attention/productivity (items 1 and 2), and hyperactivity/impulsivity (items 3, 4, and 5). The sixth item is used to assess the compliance of student in the classroom.

The following list extract from Wright (ibidem) describe the items of ADHD-DBRC:

1. Focused attention on schoolwork during academic periods
2. Finished assigned class work
3. Remained in seat during academic periods
4. Avoided calling out or inappropriate verbalizations (e.g., nonsense noises)
5. Avoided repetitive motor behaviors (e.g., table-tapping) or playing with objects
6. Complied with reasonable adult requests

The **Dyadic Parent Child Interaction Coding System (DPICS)**(Robinson and Eyberg, 1981) is aimed to assess maternal behavior and interactions between pre-school children and parent. The observational method include two sessions of 5-min (Child Directed Interaction and Parent Directed Interaction) where children and parents are observed in a playroom setting. It includes 24 parent and child behavior categories. The “Parental behaviors” category of coding system includes codes for Praises, Commands, Verbalizations and Responses to a child's behavior. The “Child behaviors” include child deviance and responses to commands. The “Parent and child affect” includes codes for verbal/nonverbal positive and negative expressions directed at children or parent.

**The Behavioral Coding Schema (BCS)**(Forehand & McMahon, 1981) The BCS is aimed at assessing the parent-child (three to six year hold) interactions skills. It may be used in clinic and home setting and applied as assessment tools of a parent-training program. In a clinic setting the parent is engaged in two five-minutes of play sessions: “Child's Game” and “Parent's Game”. In the first session, a free play task, an observer behind a one-way mirror records the ability of parent to follow the child's lead while avoiding the urge to impose their rules on the child. The second session is aimed at evaluating the ability of parent to give appropriate commands and receive compliant responses from the child. Six parent behaviors (i.e attends, verbal rewards, questions,

warning, clear and unclear instructions) and three child behaviors (compliance, non-compliance, appropriateness of child behavior) are observed. A time based recording is applied using a 30 seconds of interval. The template of the score sheet allows the observer to record the occurrence of parent-child interactions and the behavior applied. At the end of first session the data is summarized as a rate for a minute of each parent behavior while a percentage of child inappropriate behavior is provided. At the end of the second session a summary of the data is calculated counting the total number of clear and unclear instructions provided by parent is combined with the percentage of the child's compliance to instructions, the percentage of parental attends plus verbal rewards following child's compliance and the total number of time-outs. The BCS is applied in a home setting may be used to record parent-child interactions and applied behaviors during a naturalistic home observation.

The **Parenting Clinical Observational System (P-COS)** (Hill et al., 2008). A direct assessment of parenting within three domains, two competence domains: Responsive Involvement Domain t); Constructive Discipline Domain (Firmness, Positive behavior strategies, Flexibility); Problematic Discipline Domain (Hostile behavior, Verbally aggressive discipline, Physical discipline, Power struggles, Emotional misattunement, Intensity of angry/irritable affect, Predominance of angry/irritable affect).

The **Peer Social Behavior Code (PSBC)**, an effective interval-based coding procedure for direct observation of children's social behavior which is part of Walker and Severson's (1992) innovative Systematic Screening for Behavior Disorders (SSBD) adapt to children Grades 1-6. The PSBC consist of a series of 10sec intervals were it is possible to record on a 40 interval form. The contexts selected for observations are free-play situations (e.g. during recess) and the time period is length 15 min. PSBC includes five recording categories:

- Social Engagement
- Participation (behavior may be coded as either positive (+) or negative (-))
- Parallel Play
- Alone (behavior is coded checking the appropriate box)
- No Codeable Response. In this case, behavior is coded with a check when the child is out of view and a dot when he is interacting with an adult rather than a peer.

Other important details are explained in the work of Merrel (2001) available at [http://www.lionsquest.org/pdfs/merrel\\_articles.pdf](http://www.lionsquest.org/pdfs/merrel_articles.pdf)

### 3. Direct observation

---

One of the most useful techniques to gather information about pupil's behavior, both generally and specifically, with reference to identified behaviors is through direct observation. This can be used to verify the pupils' targeted behaviors and to gather further information about other behaviors that they display. This provides the ability to compare them with their classroom peer group.

The initial step during a direct observation is to gather clear and concise descriptions of the behaviors being observed. This clarity will lead to a better understanding between the professionals and caretakers. This also promotes clarity while collecting the data as all involved are fully aware of the specific information that they are collecting. This will help to eliminate problems that might arise between 'where and when' the observations were taken. Haynes and O'Brien (2000) provided guidelines for defining the different target behaviors (dangerous, restrictive, interfering, etc.).

It is important to identify which parts of the pupil's behaviors are significant and need to be focused on. This will help maintain the integrity of the observations and the data collected. Once this has been determined, the behavior must be operationally defined with sufficient detail that observers reliability can be obtained (Hurwitz & Minshaw, 2012).

While we may have identified the behaviours to record the observers will need to judge if a particular behavior is of sufficient importance to warrant being recorded. Alongside of this is the need to decide if they should

consider other significant aspects that may be impacting on the pupil being observed. These behaviors may be socially or when learning. Both parents and teachers play a significant part as they can help identify the significant behaviors and the drives, which may be powering those behaviors. They also have a good knowledge of the pupil's social world and how personal relationships may affect them.

### *3.1. Issues in Behavioral Observations*

---

No matter what behavior recording system you decide to use you will gather useful information about your pupil's behavior in school and the classroom and during times that they are relating to others. Initially, it's useful to ask the teachers to identify specific times and places that the ADHD behaviors appear and how long they may be present for. It is useful to observe pupils during challenging times when the pupil has to attempt to suppress the ADHD behaviors such as impulsivity or hyperactivity for example. Often this is during the more formal lesson times or during extended periods of time. It is also helpful to observe during more relaxed free flowing lessons to obtain a contrast of the pupil behaviour. During the free flowing lessons ADHD pupils behaviors will resemble their non-ADHD peers. The observations in less formal observations will not be helpful in collecting information about their ADHD behaviors but will serve as a useful contrast. It is important to understand the social world the ADHD pupil is working and learning in. This will provide a 'benchmark', which will help illustrate how the identified pupil is moving away from the expected peer group behavior. An example of how this could be used would be to observe one of the peers who have been identified as having the average type of behavior and the ADHD pupil. Time is spent observing one pupil then a comparable amount of time observing the identified pupil. The pupil being compared to the ADHD pupil is changed so that the observer is randomly following different children during his observations while continuing to return to the ADHD pupil. This will help create more of a sense of the class average.

There are no firm guidelines laid down for how long and how often to observe a pupil during a ADHD observation. This is probably best agreed during the initial teacher consultation. As a general rule I would expect to observe on two or three different school days for between 20 to 30 minutes. However it may be necessary to conduct specific observations during specific lessons. Small group work may be show that they are impulsive and chatty but the math's lesson in the classroom may present specific concentration issues that lead to a different behavior. It may be necessary to observe these classes on a couple of occasions. After the observation it is helpful if the observer can write a short overview of the day. Commenting on the pupils motivation, teachers approach, pupils interest in lessons, relationship with peer group, any unusual disturbances (classroom visitors), etc. Also make a note the classroom atmosphere. Is it hot or cold, has the lesson been well prepared, is there any evidence of accommodations being made for pupils that need additional help.

### *3.2. Observation methods*

---

Once the behaviors to be observed and monitored have been identified we will need to choose the best and most appropriate method of collecting and recording the data. Care must be taken to record and observe the behavior we really want to observe and not be sidetracked away from our targeted behaviors.

Wright (2002) recommends that any ADHD observation should follow the three prime behaviors isolated by Platzman et al. (1992). These are excessive motor activity, the pupil's negative vocalizations, and any off task behaviors noticed.

Wright in his online manual (ibidem) describe the different methods of recording as following:

**Event or frequency recording.** This allows the observer to build up an accurate picture of the frequency of the identified behaviors provided the behaviors have clear beginnings and ends (i.e. throwing things in class, out of seat behavior, a single vocalization). The time of the observations can be as short as ten minutes or be part of a whole day observation.



**Interval recording.** Through this method it is possible to estimate the duration or length of a behavior. Observers have to specify time periods (intervals) and then record on a sheet the presence or absence of behavior during all the period of observation. It includes three types of recording methods following described.

Generally, time intervals of 10 to 15 seconds are suitable to capture information on behaviors.

**Whole interval recording.** The examiner observes and notes when the behavior occurs throughout the entire interval. This means the observer only marks a behavior as happening IF it is present throughout the period of the observation time. An advantage of this type of observation is that it provides an idea of the time passing while the behavior is in place. However, it fails to record the behaviors that do not persist throughout the identified period of observation. This type of observation is perhaps more effective when observing positive behaviors such as time at work after a teacher intervention.

**Momentary time-sampling.** This method is a subset of the previous and it can be helpful when observing behaviors that do not have a specific identified onset or end. Once the length of the interval is settled, the observer's task is to record the occurrence or not of a behavior at the very beginning or at the very end of each time interval. They then record the result on a data sheet. This requires the observer to look at the pupil and record the behavior they notice at that specific time. This has the advantage of being accurate at the time of observation but will inevitably lead to missing other behaviors during the non-observed time, when recording.

**Partial interval recording.** This procedure aims to record if the behavior occurred at least once during the short observation interval. This type of observation has the advantage of collecting data on the observed behaviors when they happen. This is useful for noting if there is a sudden change in negative (or positive) behaviors after a specific event. This type of observation can lead to an impression of overestimation of the more negative behaviors. This is often because observers sometimes are intent on catching every specific occurrence of a behavior. Often this is used to collect information on the number of times a negative behavior, such as aggression occurs. There may not be a differentiation in the level of the aggression.

After choosing the behaviors to be observed and methods of observing, the observer decides on the length of time of the observation. There are advantages to short time intervals as it allows the finer path of the behaviors to be observed. The downside though is that the observations are reduced to say 10 to 15 seconds; a series of quickly written symbols are collected that then need to be interpreted. The longer observational periods allow for more information to be collected and written in hard copy. But this allows some behaviors to be missed during the writing of the observed period and that this lost information could play a useful part in an ADHD observation.

## 4. Functional assessment methods for evaluating challenging behaviors

---

Functional assessment will refer to the “*the full range of strategies used to identify the antecedents and consequences that control problem behavior*” (Horner, 1994, p. 401).

Alternatively, the term "functional" or "experimental analysis" refers to a more specific procedure wherein environmental variables are systematically manipulated in an experimental fashion to evaluate hypothesized functional relationships (Vollmer & Northup, 1996).

Functional assessment refers to a broader set of procedures that may or may not include an experimental analysis.

For example, an experimental analysis of a child's inattentive behavior would involve the planned introduction and removal of hypothesized maintaining stimuli (e.g., teacher attention) to determine whether the frequency of the target behavior varies as a function of teacher attention.

In contrast, a functional assessment consists of a variety of techniques (e.g., interview with teacher, direct observation of the relation between target behavior and environmental events) that may or may not include direct manipulation of environmental events, designed to determine what antecedent and consequent events could be functionally related to the inattentive behavior.

From a clinical perspective, the overriding goals of a functional assessment are to determine:

(a) the function(s) of problematic behavior (i.e., what purpose is the disordered behavior serving for the individual?)

(b) environmental events or stimuli that increase the probability that problematic behavior will occur. The term “challenging behavior” has been defined by Emerson (1995, 2001) as “culturally abnormal behavior of such an intensity, frequency or duration that the physical safety of the person or others is likely to be placed in a serious jeopardy. It can also mean the behavior which is likely to seriously limit the use of, or result in the person being denied access to ordinary community facilities”. Commonly reported challenging behaviors are aggression, property destruction and self-injurious behavior (Brosnan & Healy, 2011; Csorba, Radvanyi, & Dinya, 2011)

Many methods of functional assessment can be applied to evaluate challenging behaviors generally in subjects with development disabilities and in children with emotional and intellectual disabilities.

According to Sipes & Matson (2012), it is possible to gain information about the function of a behavior using direct methods, analogue methods and indirect methods.

The direct method has the higher ecological validity but can only use correlational data because the environment is not directly controlled. Some problem behaviors occur at low frequencies and as a consequence, they take up too much observation time. An example of direct methods are scatter plots and ABC charts. In the scatter plots, the data is collected by defining a specific interval and then obtaining information on the frequency and duration of behaviors (Touchette, 1985).

Scatter plots are simple to collect but little information can be gathered about antecedents and consequences. Psychometric properties for accurately establishing and maintaining operations of problem behavior with this approach are unknown.

In ABC charts, the observer collects data on the antecedent (A), the behavior (B) and consequences (C). According to Bijou (Bijou, Petersen, Ault, 1968) the first step of this observation process is set objective criteria to identify the possible responses of a category of behavior. Bijou underlines the importance of transforming narrative observation into systematic descriptions of the antecedents, behaviors, and consequences that occurred during the observation period. In the Bijou perspective, a behavior is based on continuous and reciprocal interactions between behavior and environmental events.

ABC charts gather a lot of information about events but low temporal information is gained, they are time consuming and subjective information can contaminate the findings.

The analogue assessment is generally referred to the Experimental Functional Analysis or EFA by Iwata (Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). EFA consists in an assessment phase in a controlled environment, a random multi-element design in which the therapist manipulates several conditions (attention, escape, alone, play) and the hypothesis formulation about maintaining functions. This method has a great ability to infer causation but it requires the occurrence of a behavior, it could stimulate the emergence of new functions of the behavior and it is not easily practicable in applied settings.

The experimental functional analysis is very time-consuming, requiring lengthy periods of time to be completed (generally between 40 and 60 sessions). Brief functional analysis has been developed, adapting the classic functional analysis procedure. The brief functional analysis consists of a 90-min session in which researchers use a multi-element design across potential maintaining conditions followed by a replication phase of assessment.

In the most of cases, the brief functional analysis allows researchers to identify the maintaining function of a behavior. However this method seems to be limited to those patients who show high-frequency behavior (Derby, Wacker, & Sasso, 1992).

Another analogue method is the concurrent choice methodology (Harding, 1999). It is used to perform a functional analysis evaluating the variables that sustain appropriate rather than aberrant behavior. This methodology is a potential solution to the problems emerging in the classical functional analysis procedures, such as the evaluation of low frequency behaviors or the risk to stimulate the problem behavior for the assessment. Finkel (2005) examined how choice could be used to identify behavioral function when functional analysis results were inconclusive. Using this procedure, authors were able to identify a maintaining condition for the participant's choice behavior, thus identifying a reinforcing approach for use during treatment.

Indirect methods do not require direct observation as information is gathered through third parties such as parents and teachers. Being less intrusive, this method is more usable over a long period of time and with many behaviors. But the cause of the function cannot be determined accurately and only correlational information can be obtained.

Example of indirect methods tools are:

- the Functional Assessment Interviews (FAI; O'Neill et al., 1997)
- the Questions About Behavioral Function (QABF; Matson & Vollmer, 1995) scale
- the Motivation Assessment Scale (MAS; Durand, 1988)
- the Functional Assessment for Multiple Causality (Matson et al., 2003)
- the Functional Analysis Screening Tool (Iwata & DeLeon, 1995)

In order to make the functional analysis very effective using indirect methods, Sipes & Matson (ibidem) suggests to progress from the less time consuming methods such as the QABF and MAS to ABC charts or EFA when further assessment is needed.

Conroy et al. (Conroy, Davis, Fox & Brown, 2002) proposed a theoretical model for addressing challenging behavior in young children. The model is based on a multilevel system.

Level 1 is focused on a primary prevention level, assessing both the physical and instructional environment of the classroom. This level promotes actions that can be applied to all children in the classroom. It involves for instance the arrangement of the classroom space, the management of materials, the classroom schedule and also the interactions between adults and children in the classroom (i.e. observing if adults provide clear instructions or if the instructions are appropriate to the materials provided).

Level 2 addresses those children whose challenging behavior is unresponsive to Level 1 interventions. The authors suggest the use of both direct and indirect (i.e. reviewing child records, interviewing teachers or caregivers) methods to evaluate the student's developmental abilities. In this level, it is possible to apply a number of techniques to improve students social and communication skills and to reduce inappropriate behaviors.

Level 3 is aimed at those children who are resistant to the interventions applied in Level 1 and 2. It is intended to identify antecedents and consequences of a challenging behavior following a functional analysis approach. The authors suggest a mix of indirect (i.e. FAI and MASS) and direct techniques (i.e. scatterplots, ABC charts) to perform this task. Once the functional hypotheses are formulated, it is possible to design specific interventions.

Many studies investigated the effectiveness of the various functional assessment methods. Alter (Alter, Conroy, Mancil, Haydon, 2008) provides a comparison between direct and indirect methodologies to perform functional behavior assessments. In particular, authors compare the classic functional analysis protocol defined by Iwata with 3 indirect measures: the Functional Assessment Interview (FAI)(O'Neill et al., 1997), the Motivation Assessment Scale (MAS) (Durand & Crimmins 1992), and an Antecedent Behavior Consequence direct observation worksheet (ABC) (Bijou, Petersen, & Ault, 1968).

The results showed a low consistency among the descriptive assessments methodologies; the overall agreement was just 56%. The study has many limitations: a small sample size and low frequency challenging behaviors during the experimental phase.

Hall (2005) evaluates the concordance between descriptive, experimental and informant-based methods to perform functional assessment. The descriptive assessment has carried out observing each participant in his natural setting over a period of 4 weeks and tracking the observations using a computerized data-collection program on a palmtop. Behaviors were assessed on a 10-s interval-by-interval basis. The experimental assessment has been carried out applying conditions and control condition through a multi-element design. The informant-based assessment has been done using the Questions About Behavioral Function (QABF) scale. Comparison of the results of these assessments showed that the informant-based and experimental assessments were concordant in most cases. The sample involved was too small to allow researchers to generalize this result.

More in general, many studies showed that descriptive and experimental functional analyses do not show complete agreement (Camp, Iwata, Hammond, Bloom, 2009).

Floyd et al. (2005) evaluate the measurement properties of the MAS and the FAI assessment tools reviewing 46 studies in which they were applied. Authors report the weakness of these two indirect assessment tools focusing in particular on the need to anchor them to stronger statistical analyses and keep into account also other variables such as customer satisfaction, or consistency across time and respondents. According to the authors, the assumption of behavior stability between contexts, implemented in these kinds of assessment tools, should be revised.

#### *4.1. Description of the above mentioned indirect methods*

---

The **Functional Assessment Interview (FAI)** (O'Neill et al, 1997) allows clinicians to gather information about the topography of the behavior, setting events, other events surrounding the behaviors (i.e. sleep cycles, eating routines), the child abilities, difficulties, communication skills and previous treatment attempts, etc. The FAI requires approximately 45–90 min to administer.

The psychometric properties of the FAI has still to be studied.

The **Questions About Behavioral Function (QABF)** (Matson & Vollmer, 1995) is a standardized test to make functional assessment in real world settings. The scale consists of 25 items distributed in 5 factors: attention, escape, non-social, physical and tangible. Each factor is a possible function underlining a target behavior. Many studies demonstrate the strong psychometrics properties of the QABF (a recent review has been recently made by Matson, Turek & Rieske, 2012). It is good to excellent reliability, considering convergent and discriminating validity when compared to other similar scales or to experimental functional analysis. The scale is able to identify the most common functions associated to various challenging behaviors.

The **Motivation Assessment Scale (MAS)** (Durand & Crimmins, 1988), a rating scale designed to assess the relative influence of social attention, tangibles, escape, and sensory consequences on self-injury but it is applicable more in general for challenging behaviors. MAS is composed by 16 items which are rated by the informant (parents or teachers) on a seven-point Likert scale. The MAS takes approximately 5-10 min to administer. Studies evaluating the inter-rater reliability of the MAS have found mixed results. The MAS demonstrates good test–retest reliability, good internal consistency but a low convergent validity of the MAS with EFA. Finally, there isn't a general consensus of research about the factorial structure of the MAS items.

The **Functional Assessment for Multiple Causality (FACT)** (Matson et al., 2003) is a 35-item measure that was constructed to identify a hierarchy of behavioral functions for individuals with Intellectual Disabilities who present maladaptive behaviors that serve multiple functions. The FACT use forced-choice questions in order to identify and measure the strength of each behavior function. In the original study (of Matson et al ibidem) emerged a five-factor structure of the FACT: Tangible, Physical, Attention, Escape, and Nonsocial. Besides, internal consistency of the subscales and reliability for the FACT were good to excellent. There are not many other studies about the psychometric properties of FACT. They have to be still extensively studied.

The **Functional Analysis Screening Tool (FAST)** (Iwata et al., 2013) is used to gather information from verbal reports about specific conditions under which the problem behavior can occur. It categorizes problem behaviors in 4 functional categories: social-positive reinforcement; social-negative reinforcement; automatic-positive reinforcement; automatic-negative reinforcement.

The FAST consists of 3 sections. The first collects information about the client, problem-behavior and the client-informant relationship. The second provides 16 dichotomous questions about antecedents and consequences of the problem behavior. The final section provides a scoring summary.

According to Iwata, reliability of the FAST is moderate at best as well as its validity, considering that the correspondence between FAST and functional analysis was 63.8%.

---

# SCHOOL CONTEXT

---

EDITED BY ALL PARTNERS COUNTRIES

## 1.ASSESSMENT

---

The aim of this section is to review theoretical issues about the ADHD behaviors in the school context, to identify behavioral/functional clusters and to collect tools (i.e. observation charts, rating scales, questionnaires, etc.).

### *1.1.Relevant studies about ADHD behavior during school activities, including also difficulties in learning and the interaction between teachers and ADHD subjects*

---

One of the major areas where ADHD behaviours can present problems is in school settings. In fact, symptoms of ADHD are frequently chronic and can compromise the quality of life in the school context where the child/young person spends most of his time and where there are many challenges to overcome. It is known that students with ADHD struggle scholastically, due to a limited engagement and frequent off-task behaviors (Junode, Du Paul, Jitendra, Volpe and Cleary, 2006). According to DuPaul & Stoner (2003) their low rates of academic engagement adds to the inconsistent work productivity.

ADHD children, compared to students without ADHD, are thought to collect lower average marks, more failed grades, more exclusions suspensions and at risk of dropping out (LeFever et al., 2002; Weiss & Hechtman as cited in Johnston, 2002; Ingersoll, 1988; Barkley, Murphy & Fisher, 2008; Molina et al., 2009). It is estimated that almost one-third of all children with ADHD have additional learning disabilities (National Institute of Mental Health [NIMH], 1999).

*In more detail, ADHD's core symptoms — inattention, hyperactivity, and impulsivity — make meeting the daily rigors of school challenging (Zentall, 1993). Difficulty sustaining attention to a task may contribute to missing important details in assignments, daydreaming during lectures and other activities, and difficulty organizing assignments. Hyperactivity may be expressed in either verbal or physical disruptions in class. Impulsivity may lead to careless errors, responding to questions without fully formulating the best answers, and only attending to activities that are entertaining or novel. Overall, students with ADHD may experience more problems with school performance than their nondisabled peers (U.S. Department of Education - OSERS, OSEP, 2003, p. 13).*

An important review of Platzman et al. (1992) highlights behaviors that most consistently distinguished ADHD children from comparison groups in both the laboratory and the classroom setting. These include four general specific behavioral categories (activity, vocalization, attention and interpersonal) and 14 subcategories. The behaviors most likely to characterize ADHD children pertain to excessive gross motor and global activity, negative vocalizations, and being off-task.

General studies about ADHD found that boys with ADHD reflect more behavioral problems than girls with the same diagnosis (Lima et al., 2008; Lopes, 2009; Pereira, Maia, Marques et al., 2008). In boys with ADHD the externalized behavioral problems – e.g. physical aggression and defense – are more frequent than the internalized behavioral problems such as low self-esteem and isolation (Lima, *ibidem*).

Using blind observations on 16 components of behaviour, Abikoff and colleagues compared the classroom behaviour of boys and girls aged 7-10 with ADHD to matched controls. The types of behaviours measured included, distracting others, distracting teachers, inattention and non-compliance during teacher-led sessions and independent seatwork. Boys with ADHD displayed more adverse behaviors in the classroom compared to controls on 15 out of 16 components, namely they displayed more disruptive and aggressive behaviour and higher levels of inattention. Girls with ADHD also displayed more adverse behaviour in the classroom compared to their matched controls on 13/16 categories, including higher levels of off-task behaviour. Girls with ADHD however, displayed less aggressive behaviour compared to boys with ADHD. (Abikoff et al., 2002).

Another observational study has found that children with higher levels of ADHD symptoms involve themselves in 2-3 times more disruptive behavior, such as running around or talking to peers and shouting out (Lauth, Heubeck, & Mackowiak, 2006) compared to matched peers. Children with ADHD display ontask behaviour 50% of the time compared to controls that were on task 70% of the time. In this study, children with ADHD displayed the highest levels of inattention during whole classroom lecture-style teaching, indicating that children with ADHD may benefit from more individualized and interactive teaching where possible. An alternative study has found that children with ADHD display less time on task during both passive (e.g. sitting and listening) and active (writing) time on task and are 2.5 times more likely to engage in off-task behaviour than peers after allowing for SES and academic ability (Junod, DuPaul, Jitendra, Volpe, & Cleary, 2006).

According to the teachers' perceptions, children with ADHD differ from their peers without ADHD mainly because of their behaviour and its consequent effects within school environment. Children exhibiting ADHD symptomatology also exhibit behaviour problems at a higher frequency and create larger effects within school environment (Baptista, 2010). In fact, studies found that there is a strong association between hyperactivity and behavioral problems symptoms (Lopes, *ibidem*).

Behavior is also affected through immature self-regulation of affect, motivation and arousal. This condition *“may lead to greater emotional expression in reactions to events and a diminished ability to induce motivational states in the service of goal-directed behavior”* (Raggi, 2008, p. 15). Studies have shown that children with ADHD demonstrate lower work productivity, lower self-expectations, less persistence and more discouragement at academic tasks, less enjoyment of learning, and a preference for easy over challenging work (Carlson et al., 2002; Hoza et al., 2001). All of these conflict situations reduce student productivity and opportunities for learning.

With regard to the study of self-perception/self-image from children with ADHD, Ferreira (2010), Maia (Maia et al., 2011) found that they show lower values in the different domains of self-image and global self-esteem than other children of the same age, needing every possible support for a healthy emotional development.

The difficulties in sustaining attention long enough to properly develop and retain auditory information has negative implication in the acquisition of basic skills. In school we could observe the following particular problems: deficit of short-term memory; coordination problems; bad handwriting; problems with spelling; problems of visual and auditory information processing; slow in learning to read; a slow reader; trouble with mathematics or numbers; trouble with reversing letters.

The difficulties in producing visual and auditory information are caused by ineffective functioning of the central nervous system. Often, verbal information seem to ‘goes in one ear and out from the other’, while difficulties to decode visual information often results in copying errors and omissions of the last syllables of a word and the last words of a sentence during the reading. The use of very simple verbal and written sentences is another consequence of a deficit in short-term memory. Overall, in the early stages of language production it is possible to observe difficulties such as stammering, improper use of the syntax and grammar of nouns, verbs, adjectives and adverbs.

The negative effects on learning and in particular on reading, math, and written communication are well documented in literature (Anderson, Williams, McGee, & Silva, 1987; Cantwell & Baker, 1991; Dykman, Akerman, & Raney, 1994; Zentall, 1993). Cabeleira (2009) has demonstrated that children without ADHD have better reading process performance at a cognitive level than children with ADHD.

Findings from Mash and Barkley (2003) demonstrate that children with ADHD have greater difficulties in the development of motor coordination, especially in the planning and execution of complex, lengthy, and novel chains of goal-directed behavior. During the gym activities it is possible to observe problems of coordination, such as balance, posture, throwing, kicking and catching. As documented in Raggi and Chronis (2006) this condition could compromise sports-related or mechanically inclined activities such as music, football, art and result in difficulties within the classroom that may include poor penmanship, typing errors, and producing sloppy work. To overcome these difficulties it is necessary to use specific, constant daily exercise.

In summary, Zeigler Dendy subdivided the scholastic difficulties of students with ADHD as following:

### **Inattention/Poor Concentration**

- Difficulty listening in class: daydreaming, space out and miss lecture content or homework assignments.
- Lack of attention to detail: makes “careless mistakes” in work; doesn’t notice errors in grammar, punctuation, capitalization, spelling, or changes in signs (+, -, x) or exponents in math.
- Difficulty staying on task and finishing school work; distractible: moves from one uncompleted task to another; when distracted, has difficulty refocusing on work. - Lack of awareness of grades: may not know if passing or failing a class.

### **Impulsivity**

- Rushes through work: doesn’t read directions; takes shortcuts in written work (such as doing math in his head); may not read the whole question before giving an answer; doesn’t double check work (a greater problem among students with ADHD hyperactive/impulsive).
- Difficulty delaying gratification: gives up working for rewards occurring in too distant future (two weeks to six months or more). (Working for grades requires delaying gratification for six weeks or more.)

*Table inserted with the direct authorization of the author Chris Zeigler Dendy.*

The report produced under U.S. Department of Education (U.S. Department of Education - OSERS, OSEP, 2003) is another important resource for school and home where it is possible to find a complete description of the major academic problems of students with ADHD in relation to their primary characteristics and the treatment implication.

#### **1.1.1. ADHD and the area of executive function**

It is important to underline that in ADHD individuals, academic performance does not seem to be related to co-morbid conduct problems, or to the disruptive hyperactive/impulsive symptoms. Often, teachers are concentrated on the disruptive nature of the externalizing behaviors and they think that the first intervention should be focus on them. Instead, recent research has found that academic interventions for ADHD individuals focused on executive function (EF) deficits (such as working memory, planning and response inhibition) and

inattentive symptoms can improve response inhibition, reasoning and parent-rated inattentive symptoms (Klingberg et al. 2005) are more effective.

According to Barkley (1997) the deficit is hypothesized to affect numerous executive functioning processes including nonverbal working memory, delayed internalization of speech (i.e., verbal working memory), immature self-regulation of affect/motivation/arousal, impaired reconstitution, and reduced motor control/fluency/syntax.

Deficits in nonverbal working memory appear to result in forgetfulness, an impaired ability to organize and execute actions relative to time (i.e., time management), and reduced hindsight and forethought, leading to a reduction in the anticipation of future events (Mash and Barkley, 2003). These problems may manifest in ADHD as difficulty remembering to complete and turn in homework assignments, difficulty planning ahead for completion of long-term projects, and difficulty prioritizing or organizing homework tasks.

Berg-Rolness (2010, p. 17), in his study state that: “*compared to normal controls, children with ADHD have been found to exhibit significant impairments to inhibition (e.g., interference control and response inhibition), working memory, emotion regulation, planning, cognitive flexibility and phonetic fluency (Berlin et al., 2004; Harris et al., 1995; Marzocchi et al., 2008; Oosterlaan, Scheres & Sergeant, 2005; Pennington & Ozonoff, 1996)*”. In particular, at school it is possible to observe children and adults with ADHD having problems with analyzing, planning, organizing, scheduling and completing tasks at all - or on a deadline. Professionals must avoid misdiagnosis through an exhaustive assessment that also considers the educational aspects so as guarantee the child’s scholastic wellness.

**Executive Function Deficits that have a profound effect on school work**

The majority of students with ADD/ADHD also have deficits in the key executive functions listed below:

1. Poor organizational skills
2. Poor working memory
3. Difficulty activating and maintaining alertness
4. Reconstitution (taking issues apart, analyzing the pieces, and combining into a new whole)
5. Internalizing language
6. Controlling emotions
7. Shifting (from one issue or event to another)
8. Planning and organizing materials and assignments
9. Controlling emotions
10. Planning and organizing materials and assignments
11. Self-monitoring

Table inserted with the direct authorization of the author Chris Zeigler Dendy.

*1.1.2. Age differences*

Recently more attention was devoted to subjects with precocious signs of conduct problems and ADHD (younger than 6 years old) with regard to the impact of ADHD in the school context and academic achievement. Some authors talk about a “pre-school variant of ADHD”, even though the subjects show similar symptoms, behavioral patterns, co-morbidities and developmental risk of more traditional schooled ADHD children (Daley et al., 2009). Following the study of Sonuga-Barke and colleagues (Sonuga-Barke et al., 2003), in ADHD preschoolers’ children, the main dysfunction seems to concern their inhibitory control, while the association with planning and working memory dysfunctions does not appear significant. This can explain the persistent patterns of aggression, out of control impulses, and risky behavior that often characterize these children, and also the strong impact on overstimulation on their behaviors, for example by sights, sounds, and the presence of others.



With regard to the academic achievements these subjects were followed in longitudinal studies, during the later school experiences (for a review Spira & Fischel, 2005 and Daley & Birchwood, 2009). These studies put on evidence problems in acquiring basic pre-reading and mathematics skills (Mariani & Barkley, 1997); poorer reading ability than controls at ages 7 and 9, deficient reading performance persists at age 15, and, in general, a higher prevalence of reading-disabilities in hyperactive adolescents than control (McGee et al., 1991); There is also a poor long-term reading achievement which was observed by Rabiner and colleagues (2000), more stronger for inattentive subtype. From these studies, the usefulness of an early diagnosis emerges, and also the opportunity to implement interventions based on the parent training, for example in the *New Forest Parent Training* (NFPP) (Daley et al., ibidem).

During teen years, especially when hormonal changes of adolescence are going on, symptoms of ADHD (distractibility, irritability, poor concentration, hyperactivity, impulsivity) may intensify which will affect the pupils scholastic success. Grades may fall, particularly if the teen is not receiving ADHD treatment.

The more common externalized behaviors of subjects in the classroom concern distractibility, forgetfulness, easily bored, disorganization, inattention or an excess of attention. Teens with ADHD may also be fidgety or they can be so busy focusing on other things they forget about the task at hand. At length, their frequently scholastic failures and difficulties in relations with peers also have a negative impact on self-esteem, on their hope of success in the future, resulting in many cases in sadness and depression (Fisher, Cullen, & Turner, 2000).

There has been a lot of research that has been conducted to assess the incidence of ADHD on educational problems. The academic underachievement of children and adolescent with ADHD is a common outcome; see Frazier and colleagues (2007) for a meta-analysis. Moreover, Smith highlights that ADHD contributes to the development of alcohol and other drug (AOD)-related problems if it persists into adolescence and adulthood (Smith et al., 2002). In a prospective longitudinal study, Barkley and colleagues (1990) followed some children with ADHD and a control group for 8 years and they found that the use of alcohol, at a mean age of 15 years, was 40% for the ADHD group, and only 22% for the control group. This result suggests an association between ADHD and early onset of alcohol use. But, this association can become weaker with the age. In fact, in a study involving young adults (mean age of 25 years) no significant difference in alcohol use was found between people with ADHD (92%) and control (95%)(Weiss & Hechtman 1993). Some students may use narcotics, alcohol, and other drugs such a form of self-medications. In fact, they claim that it decreases frustration associated with the disease. As in a vicious circle, the use of these drugs aggravates other problems such as depression, low self-esteem, and distractibility affecting negatively academic success. It is very important to inform students about the interactions between psychotropic medications and alcohol, particularly students who are prescribed stimulants. Students need to be aware that alcohol is a factor in half of college acquaintance rape cases (Fisher et al., ibidem).

At university level, ADHD young adults can deal with a new set of problems, related to the necessity to manage more complex tasks and to assume the responsibilities needed to be successful in their study activities. The different structure with respect to high school, where class attendance was often mandatory and study periods to complete an assignment were protracted, poses new challenges for individuals with ADHD as it becomes more necessary to be autonomous and self-regulated. The academic difficulties, also in this period of life, are often associated with higher rates of dropout. Internalized diseases, related to self-esteem, negative thinking and maladaptive thoughts can modify the core symptomatology of ADHD. For these subjects cognitive-behavioral interventions can support psychopharmacology to improve their skills and modify cognitive distortions. Generally these interventions are aimed at providing the subject with strategies for coping with their functional impairment: organization and planning; distractibility; cognitive restructuring; communication skills (Safren et al., 2005).

### 1.1.3. The Influence of Teacher-Student Relationships

*“Research has found that classroom environments in which students have strong and supportive relationships with their teachers are associated with children’s positive peer relationships and social adjustment (Howes & Hamilton, 1993; Stuhlman & Pianta, 2001). Strong student-teacher relationships can also serve as a buffer*

against student behavioral problems (Meehan, Hughes, & Cavell, 2003; Stuhlman & Pianta, *op. cit.*). For instance, Meehan et al. (2003) showed that teacher-student relationships had a significant impact on the rates of aggressive behaviors, particularly among African American and Hispanic students. Thus, early positive relationships between students and teachers are associated with higher levels of school adjustment and the attenuation of negative student behavior outcomes” (Leff et al., 2011, pg. 2). Relatively little research has explored the experience and behaviour of teachers who teach a child with ADHD. However, a study comparing teachers of 64 children with ADHD and non-ADHD controls found that teachers report higher levels of stress during interactions with children with ADHD compared to nonADHD children. Teachers also report higher levels of stress when children with ADHD display co-morbid oppositional behaviour or social impairment compared to children with ADHD who do not display these comorbid difficulties (Greene, Beszterczey, Katzenstein, Park, & Goring, 2002).

### 1.2. An overview of assessment tools used by the partner countries in school context

School is the place in which children and adolescents spend the most part of their time and where, arguable they experience their greatest difficulties in terms of learning and behavior. Teachers are directly involved in the identification of all problems which occur in classroom, often gathering data from rating scales or questionnaires regarding symptoms. For this reason, before beginning to plan an intervention, teachers must observe their students more closely and systematically perhaps with the help of specific assessment tools. According to the previous classification (see chapter on Assessment) the assessment tools used in each partner country are listed in the table below. In this way it is possible to highlight the specific method used by them in the school context and understand how the Project could empower the method of Functional assessment.

TOOLS USED IN SCHOOL CONTEXT	UAEI (PT)	ADDISS (UK)	CEDAP (IT)	TCD (IE)
<b>Conners Parent and Teacher Rating Scale-Revised</b> (CPRS-R/CTRS-R) (Conners, 1997)	x	x	x	x
<b>CASS:L – CRS-R for adolescent</b> (Conners, 1997)			x	
<b>SNAP-IV</b> (Swanson, Nolan and Pelham, 1998)		x	x	
<b>ADHD Rating Scale – IV</b> (DuPaul et al., 1998)				x
<b>Strengths and Difficulties Questionnaire</b> (SDQ)(Goodman, 1997)	x	x	x	x
<b>Child Behavior Checklist</b> (CBCL)(Achenbach, 1991)	x	x	x	x
<b>Vanderbit ADHD Teacher and Parent Rating Scale</b> (VARS)(Wolraich et al., 1998)		x		x
<b>Brown Attention-Deficit Disorder Scales for Children and Adolescents</b> (BADDS)(Brown, 2001)		x	x	

<b>Impairment Rating Scales (IRS)</b> (Fabiano, 2006)		x	
<b>Disruptive Behavior Disorders Rating Scale (DBDRS)</b> (Pelham, Gnagy, Greenslade, & Milich, 1992)	x		
<b>Behavioural Problems Scale from Social Skills Rating System (SSRS)</b> (Gresham & Elliott, 1990)	x		
<b>School Situations Questionnaire (SSQ)</b> (Barkley, 1997)	x		
<b>Rutter Teacher Questionnaire</b> (Rutter, 1967)			
<b>EDAH</b> (Riba & Garcia, 2003)			
<b>Test of Everyday Attention for Children (TEA-Ch)</b> (Manly et al., 2001)	x		x
<b>Scale per l'individuazione dei comportamenti di Disattenzione e Iperattività (SDA-I/G/B)</b> (Marzocchi, Re and Cornoldi, 2010)			x
<b>Scala per l'Identificazione Precoce del Disturbo da Deficit di Attenzione e Iperattività in età Prescolare (IPPDAl)</b> (Marcotto et al., 2002)			x
<b>Questionario sindromi Compresenti (COM)</b> (Cornoldi, Molin, Marcon, 2004)			x
<b>Scala per la valutazione dei Comportamenti Dirimpenti (SCOD)</b> (Marzocchi et al., 2001)			x
<b>Reading assessment tool</b> (Cabeleira, 2009)	x		
<b>MT and MT-2</b> respectively for primary school and secondary school (Cornoldi, Colpo, 1995, 1998, 2010, 2011)			x
<b>Batteria per la Valutazione della scrittura e della competenza ortografica</b> (Tressoldi & Cornoldi, 1991, 2000)			x
<b>Batteria per la valutazione della Dislessia e della Disortografia Evolutiva(DDE-2)</b> (Sartori, Job and Tressoldi, 1995, 2007)			x
<b>Test di valutazione delle Abilità di Calcolo - Gruppo MT (AC-MT)</b> (Cornoldi et al., 2002)			x
<b>Test delle Abilità di Calcolo Aritmetico (ABCA)</b> (Lucangeli, Fiore & Tressoldi, 1998)			x

<b>Functional Assessment Checklist for Teachers</b> (F.A.C.T.)(March, Horner, Lewis-Palmer, Brown, Crone, Todd, & Carr (2000)	x
<b>Standardized ADHD School Observation Form</b> (Wright, 1995)	x
<b>Daily Behavior Rating Report Card</b> (Wright, 1995)	

*Note: all references cited in this table are collected in the References section: Assessment Tools.*

## 2. INTERVENTION

The aim of this section is to review strategies of intervention in the school context to face problematic behaviors (i.e. difficulty in the active engagement, off-motor task, disruptive classroom behavior, inattention, etc.).

### *2.1.Relevant studies about the intervention strategies to manage problematic behaviors at school (ITD-CNR, Italy)*

Three common approaches tackle the most problematic ADHD symptoms at school are: behavioral strategies, academic interventions and social relationship interventions.

Du Paul et al. (2006) reviewed these strategies, providing examples and citing many findings the efficacy of their application at school. According to the authors, behavioral interventions for students with ADHD include antecedent-based strategies, consequent-based strategies and self-management approaches. In most cases, the optimal behavioral protocol will include components of all three approaches. Effective antecedentbased interventions cited by authors are: choice-making interventions asking students to choose from two or more concurrently presented classroom activities; modify task assignments, for instance reducing their overall length and/or breaking the assignment into smaller sub-units; the active teaching of classroom rules. A set of consequent-based strategies useful for ADHD related behaviors are: negative reprimands that could be successful with ADHD patients only when made in a brief, calm and quiet manner and secondly, the authors cite token reinforcement economy. For ADHD student's immediate consequences are most effective in promoting a behavioral change. A useful tool to create a link between school and family is the Daily Behavior Report Cards which allow teachers and parents to set behavioral goals, to monitor daily progress and to frequently reinforce the students success.

In concluding the review of behavioral interventions for ADHD, the authors suggest the use of functional assessment data in order to plan interventions that are strongly associated with the function of a target behavior. Broussard & Northup (1995) provides an example of functional assessment conducted in regular education classrooms with students of average intellectual functioning. The authors performed a descriptive assessment, which involved interviewing teachers, reviewing academic records and observing the students in the classroom. Starting from this phase, they formulated three hypotheses regarding potential maintaining variables. This is followed by a brief functional analysis phase and a contingency reversals phase (in which a consequent event that followed inappropriate behavior was given contingently for an alternative appropriate behavior) has been conducted to choose the most accurate hypothesis.

The authors reported an increase in work completion, accuracy and a reduction of the disruptive behaviors observed but the experiment had many limitations and these results cannot be easily generalized.

Ervin et al. (1998) evaluated the possibility to perform school-based functional assessment for adolescents with ADHD-ODD. The authors were interested in the involvement of teachers throughout the functional assessment process and offered them choices out of several intervention strategies.

The study was conducted with 2 pupils of 13 and 14 years old. Starting from multiple sources (interviews with teachers, interview with participants, direct observations), the authors and teachers developed collaboratively

a functional hypothesis about the students' behaviors. These hypotheses were validated by teachers manipulating the classroom variables, (i.e. providing alternative tasks, giving extra time to complete a task, allowing brief breaks, reducing peer attention, providing frequent reinforcements) using a brief reversal design. The interventions made by teachers obtained improvement in the students' behavior, showing a functional relation between environmental variables and problem behavior.

Another positive scholastic intervention on student's problematic behaviors is described by Davey and colleagues (Davey et al., 2006). They applied functional behavioral assessment in a public special education school with a subject diagnosed with bipolar and ADHD disorders. The student is a 6-year subject who showed aggressive behavior and had refused to perform scholastic tasks. The functional behavioral assessment has been conducted using observational data, indirect measures and ABC charts. The observational data has been gathered using a partial interval recording system, calculating the percentage of intervals with aggressive behaviors at the end of each day. Parent, teacher and therapist interviews and a review of students record (using the Achenbach Child Behavior Checklist) were collected as indirect measures. Finally, the ABC chart allows researchers to hypothesize on the adult attention that may be maintaining the aggressive behavior. A functional experimental analysis was not conducted.

The intervention included: strengthening a desired replacement behavior, reinforcing an alternative behavior as well as positive procedures already used in the classroom such as token economy, clear instructional and behavioral expectations. With the introduction of the FBA based intervention, the student aggressive behavior slowly decreased in frequency.

In a single case study, Burke and collaborators (Burke et al., 2003) applied a functional behavioral assessment (FBA) procedure on a child exhibiting high rates of problem behaviors, from off-task to disruptive behaviors. The FBA was conducted using both indirect observations, i.e. school records, teacher interviews, curriculum-based measure, and direct observations. The hypothesis that problem behaviors functioned to escape/avoid reading tasks was formulated and tested via an experimental functional analysis procedure. Then, an intervention was carried on and its effects were evaluated.

In order to promote the ADHD students' academic progress, the **academic interventions** were aimed at modifying teacher instructions and adopt peer-mediated strategies and sometimes computer-assisted instruction. A useful tutoring strategies for ADHD students is the Class Wide Peer Tutoring (CWPT; Delquadri et al., 1986) described below. Although the computer-assisted instruction seems to be a promising strategy, very few controlled empirical investigations have examined CAI effects in the ADHD population. DuPaul et al. (ibidem) review and social **relationship intervention** for ADHD students who often experience difficulties with peers. Tough Kids Social Skills is one of the most promising social skills program developed by Sheridan (1995). Unfortunately, there are not many studies demonstrating the efficacy of this kind of interventions for ADHD students.

Indeed, **simple environmental changes** such as increase structure and predictability, reduce distractions, create routines, a smaller classroom setting, goals and rewards represent interventions may help to prevent the negative self-esteem issues that develop after repeated frustrations, failures and negative interactions with others.

## *2.2. A description of good intervention practices in this context, with attention to both methodologies and tools (Eds. by all Partners)*

---

As reviewed by **ADDISS (UK)**, Miranda, Presentación and Soriano (2002) investigated the effects of a multicomponent classroom intervention for ADHD entitled 'The Inattentive and Impulsive Child (ADHD) in the Classroom: What We Should Know in Order to Cope with This Situation.' This intervention included a psychoeducation component, strategies for behavioural modification classroom in addition to strategies to help promote child learning. Teachers also taught cognitive behavioural strategies aimed at teaching children how to recognise and manage their own behaviour independently. Acceptance of the intervention was associated with reduced parent and teacher reported ADHD symptoms in addition to reduced frequency in disruptive

behaviour as reported by teachers. Teachers also showed improved knowledge about ADHD as assessed by true/false responses to an ADHD fact sheet (Miranda et al., ibidem).

The incredible years (IY) programme for disruptive child behaviour also has a teacher component that aims to improve teacher behaviour management strategies and encourage child pro social behaviours through the use of praise and reward. The intervention also encourages collaboration between teacher and parent and the involvement of parents in home-school behaviour plans. The effects of the teacher component of the intervention on ADHD symptoms have not been tested empirically. In one study the teacher's version of the intervention was used in combination with a classroom based adaption of the child version of the IY intervention, which was also delivered by the teacher. In this study, receipt of teacher led interventions was associated with reduced disruptive behaviour relative to children in control classrooms (Webster\_Stratton, Jamila Reid, & Stoolmiller, 2008).

According to an **Italy review (ITD)**, there are three main components for a successful experience in school. The first is effective academic instruction, the second regards behavioral interventions and finally an important role is played by classroom accommodations. An exhaustive description of these components is given in the following free online resources:

- <http://www2.ed.gov/rschstat/research/pubs/adhd/adhd-teaching-2008.pdf>: is the guide of the U.S. Department of Education (2008) where teachers can find a lot of techniques to introduce and conclude a lesson, individualize instructional practices, set up special classroom arrangements and so on;
- <http://www.education.com/reference/article/add-adhd-strategies-tips/?page=2>: this area is aimed to give information about strategies, tips, and ideas to school personnel to help students with ADD/ADHD; - <http://www.education.com/reference/article/accommodations-suggestions-students-ADHD/>: give an exhaustive list of Classroom accommodations for Students with ADHD;
- <http://add-assets.com/asset/3823.pdf> offer a wide list of accommodations to overcome the most frequent challenges which an ADHD student generally to face (interrupts, loses focus, not complete assignments, etc.), in line with Section 504.
- [http://www.nasponline.org/about\\_nasp/positionpapers/Home-SchoolCollaboration.pdf](http://www.nasponline.org/about_nasp/positionpapers/Home-SchoolCollaboration.pdf) present the Position Statement of the National Association School Psychologists (NASP) in which is discussed the importance of home-school collaboration, and in particular of the role of educators, families and school psychologists to enhance learning.

According to Kos (2008), it is important to instruct teachers in the correct use of all of these strategies because if the strategies are implemented incorrectly they may be ineffective. Teachers should also be encouraged to use these strategies often in their classroom to help manage students with ADHD.

Teachers and other caregivers need to know the rules of application of behavioral interventions for students with ADHD generated by Section 504 of the Vocational and Rehabilitation Act of 1973 and the Individuals with disabilities Education Act (IDEA) of 1997. Brock (2002) synthesize the meaning of these two acts as following:

- *Section 504 has been used to require the development of general education accommodation plans. These plans are designed to ensure that the students with ADHD are provided a free and appropriate education. Among the recommended components of these plans are a variety of classroom interventions (including behavior intervention planning), with a special emphasis on environmental modifications.*
- *IDEA, with its requirements for functional behavior assessments, has increased the frequency with which classroom-based behavioral interventions are considered for these students. The list of specific strategies for promoting success for students with ADHD include task duration, the structure and duration of the lesson, the use of visual and auditory cues, give praise, the use of multi-sensory activities, peer tutoring and cooperative learning strategies, give routine, the use of novel, interesting, highly motivating material and so on.*

**ADDISS (UK)** underlined that improving the relationship between parents and teachers may also be another important part of interventions involving teachers. Parents of children with ADHD report feeling less supported

by their child's teacher (Rogers, Wiener, Marton, & Tannock, 2009) and improving coordination between parent and teacher can help to identify and solve academic problems (Raggi & Chronis, 2006). The Family-School Success model (FSS) (Power et al., 2012) includes a teacher daily report card that evaluates the child's on target behaviours in school for parents to reinforce at home. The FSS also aims to improve parent-teacher relationships through parent-teacher problem solving consultation sessions. The effectiveness of the FSS was assessed in a sample of school age children with ADHD. Parents who had received the FSS intervention reported improved parent-teacher relationships. In addition, parents noticed reduced child inattention during homework tasks (ibidem).

The Homework Success Program (HSP) of Power (2001) is another intervention aimed at helping teachers and parents to manage the difficulties to do homework for children with ADHD. It consists of 7 meetings between the family and school for children aged 6-11 years. It also includes parent training and emphasizes the importance of collaboration between parents and teachers.

The importance of play was explored by **Portuguese authors** as a useful strategy for the teaching and learning process of children with ADHD (Pinto, 2012; Costa, 2012).

In focuses on the traditional play through the methodology of case studies in which three 7 year old children participated, findings revealed that through the use of play activities teachers can promote the knowledge construction, socialization and creativity in their students with ADHD. At the same time, children feel motivated and responsive towards teachers' demands while improving both their behavior and attention (Costa, 2011).

With regards to the use of electronic games, teachers were unanimous is considering their advantages for the learning and development of children with ADHD. However, teachers warn about the indiscriminate use of these technologies, especially considering that when excessively used they can actually cause additional behavioral problems and in turn make it more difficult for children with ADHD to concentrate in school activities (Pinto, 2012).

The case study methodology was used to demonstrate the importance of play activities in teaching and learning processes of students with ADHD. A total of 3 students with ADHD were observed in two situations:

- 1 – doing a worksheet (Portuguese Language) in classroom with all the classmates
- 2 – participating in recreational and educational games about the questions within the worksheet previously completed. All the classmates participated in these games

Students achieved better results in their performance in contents presented through games (that were planned to be the same as those from the worksheet), than in contents presented by the worksheet.

**UK partner (ADDISS)** commented that the Daily Report Card (DRC) intervention strategy is one of the best methods to allow teachers to monitor and modify target behaviours that are specific to a child. The teacher provides feedback (preferably immediate) in the classroom and makes a report of the behaviours for parents to reinforce at home. The intervention is therefore a good way of encouraging home-school collaboration. The behaviours are usually targeted according to the area where the child displays most difficulties. In a recent study assessing the effectiveness of a DRC intervention for children aged between 5 and 12 and displaying disruptive behaviour in the classroom, Owens (Owens et al., 2012) found that 72% of the children who received the intervention showed improvement in all of the target behaviours that they had been set. A further 20% showed improvement on at least one of the target behaviours.

Particular research notes that academic interventions which demonstrate academic benefit to children and adolescents with ADHD (Raggi & Chronis 2006) have received more than behavioural interventions (DuPaul & Eckert 1998; Raggi & Chronis, 2006).

The **Italian partner (CEDAP)** uses the following procedure:

Clear guidance for teachers about children with ADHD and their performance at school appears to be essential in responding effectively to the children's needs. A description of the neurobiological features of the disorder

must be given to explain the significance of the child's behaviour correctly. It is necessary for the specialist to implement teacher management strategies in the classroom in order to make lessons more accessible to everybody, including children with ADHD. Working in a class with such children, the basic rule is to structure the environment in a predictable manner by using simple but fundamental expedients such as:

- *Including structured modalities even during moments of relaxation and transition:* during the recreation organised games should be encouraged to satisfy the need for physical exercise (playing catch, ball games, etc.); moving from one place to another must be done very calmly (a hasty approach increases children's excitability) other strategies like asking the most restless child if his classmates are lined up correctly and are ready to move can help.
- *Establishing routines* that balance the need for everyday organization of activities and regular daily patterns with the need for new experiences, a distinctive feature of hyperactive children (organization of methods and working time constant/variety of contents).

Regarding useful routines, some examples could be:

- letting all the students into the classroom at a set time
- beginning lessons with routine checking of the educational material needed for the day
- presenting daily activities with indications of how long each one is likely to take
- arranging breaks, if possible at the same time every day
- organizing activities, structured and arranged with the help of students, to be done during breaks
- assigning homework, leaving plenty of time to check that everyone has written it down and avoiding rushing through instructions at the end of the lesson
- *Establishing shared rules* both in the use of objects and relationships with peers and/or adults. Having clear rules, which everyone is familiar with helps in the organization of classroom space and time. This makes everyone aware beforehand of what actions are approved and which are unacceptable. All familiar routines and pre-established tasks help give the child support in understanding and managing everything that happens around him and in what he is expected to do.

There are no rules and routines which are universally effective or which can be rigidly applied: each class has its own peculiarities and every teacher will be able to find the best solution for his own class. However, there are some strategies that can simplify the teacher's work and class management.

As regards rules, it is important to remember that when they are drawn up they must:

- be discussed and chosen with the children who are given the opportunity to voice their opinions: taking part in the decision of a rule motivates respect for it
- be simple and clear: "*Raise your hand before talking*" rather than "*Avoid interrupting while the teacher is explaining and your schoolmates are working*"
- suggest positive behaviours and not prohibitions: "*Tell the teacher before going to the bathroom*" rather than "*Don't go to the bathroom without the teacher's permission*"
- describe exactly what it is best to do. As stated above, children often don't know what is expected of them so often they don't know how to manage their behaviour. Sentences like "*You should be good*", "*You shouldn't talk*", "*Behave properly in the gym*", are general and vague and don't give any direct information about what it is really appropriate to do. It is possible that the child doesn't really understand the meaning of "*Be good*". However he may understand the concept, but, in practice, he doesn't know how to act. So, it is important to be quite explicit about the expected behaviour according to different contexts: e.g., "*You should wait for your turn in group games*", "*When the teacher is explaining, listen in silence*", "*Before talking, you should raise your hand*", etc.
- should be limited in number and important for class management: too many rules risk making them difficult to respect (6 or 7 should be enough)
- should be written down on a poster with the children's participation, using colourful pictorial symbols which make them easier to remember
- *Provide feedback to the child about his conduct* using visual and auditory signals in response to the required appropriate behaviour: for example, giving looks of approval or disapproval, or uttering



sentences like “ Well done Luca, you have tidied up your drawing tools nicely, and now you can have a snack”.

- *Help the child to reflect on his behaviour* and become aware of the consequences that particular actions have or have had in the past.
- *Arrange classroom space.* The arrangement of the desks can stimulate the interest of children with ADHD as well as the rest of the class. When managing the class, you can evaluate what is the best layout. It is necessary to consider not only the spatial positioning of the desks but also how this may stimulate interactions with the environment, peers and teacher.

For this purpose it is useful to ask oneself some questions.

- Can you see the child from your desk?
- Is it easy to have eye contact with the child? If you are facing the pupil you can give immediate feedback by signalling approval or show an invitation to modify behaviour and you can verify attention levels when giving verbal instructions.
- Is it easy to get to the child to check whether he has performed a task or written down notices and reminders for home? As well as: can he easily be reached if you have to intervene and physically manage his impulsivity and/or hyperactivity at a behavioural level in emergency situations?
- Are there any classmates close to the child? What are these children like? Quiet or lively? Bear in mind that it is important to surround the ADHD child with positive role models and sit quiet children next to him. - How many classmates come into contact with the child if he stands up?
- Is the child with ADHD facing the window?
- How many classmates can he see from his place?
- How many distractors are there in the classroom and what are they? There are many elements and factors that can exacerbate the typical distractibility of a child with ADHD. Although you cannot eliminate or neutralize all of them, it is important to take them into account in the arrangement and organization of the classroom.

We must try to bear in mind the most frequent of these, placing them in the classroom in the most neutral manner possible:

- posters: display only those that may be of practical use in school activities, with rules to remember (multiplication tables, verbs, cardinal points, grammar elements), or indications that make the organization of a task easier (for example, read the text, underline the most important information, think about how to do the task, concentrate and begin the task);
  - waste paper basket: given the frequent requests to sharpen pencils or throw away paper, consider whether it is less distracting to place the basket next to a child with ADHD or move it away from him
  - clock
  - neighbouring classmates
  - cupboards/ bookcases
  - door and windows
- *Evaluate time and difficulty of the tasks.*

It is important to provide clear concrete instructions about task timing. Teachers can use cut out symbols, which serve as visual reminders about the type of work in progress (see attachments). In the preparation of posters with rules and routines, it is better to use symbols and images and these should be expressed positively (e.g. When you want to speak, remember to put up your hand, rather than You mustn't speak without first raising your hand to ask for permission (see attachments).

This is to prevent problem behaviours (antecedents) or to act on consequences. Clear guidance to teachers is another important feature of this work because at school children with ADHD can show signs of disruptive behaviours, which are difficult to contain and manage. It is best to begin from the observation (first casual and then systematic) of problem behaviours (not generic but descriptive), so as to be able to identify the behaviour in terms of frequency and meanings.

Example of systematic observation:

Teacher	Time	Antecedent	Behaviour	Consequences	Child's answer

Interventions based on antecedents are referred to as attempts to change the environment that surrounds children with ADHD, in order to promote desirable behaviours and reduce the number of undesirable behaviours.

The focus is on making changes before a problem arises. A child with ADHD may present significant problems in the classroom related to:

- Difficulty of inhibition of answers that require highly structured and organized activities. Thus in interactions it is necessary to be concise and synthetic.
- Perception of time. As well as being concise it is necessary to be quick. It is helpful to use few words and plan short, rapid activities.
- Difficulty in postponing gratification. Children with ADHD are sensitive to reward conditioning but they need frequent and rapid feedback about their work and activities. Faced with a choice between a small reward immediately and a larger one later, they generally choose the immediate reward, regardless of its size even if they are able to discern which is the larger reward.

This suggests that to maintain a high motivational level in a child with ADHD, it is necessary to give simple rewards, but especially prompt ones.

On the contrary, the work on consequences can operate on two levels: rewards and punishments (token economy or response cost).

A. Rewards or reinforcements (they increase the frequency of behaviour that precedes them)

- assign a positive consequence (positive reinforcement)
- remove a negative consequence (negative reinforcement)

B. Punishments (they decrease the frequency of behaviour that precede them)

- assign a negative consequence (reproaching him)
- remove a positive consequence (take away a toy or put a stop to a pleasant activity)

When using a points system (token economy) it is possible to insert response cost, a mechanism of losing points, while accumulating points may result in rewards or taking part in enjoyable activities.

It is used for the guided elimination of negative behaviours, which are not particularly serious (snatching items from classmates, interrupting a task, not performing a task).

A points system can be set up and explained carefully to the child. It consists of rewarding a series of targeted behaviours and tasks, and penalizing other inappropriate behaviours. The child will start each day with a certain number of points (e.g. 10 token/points) which may increase or decrease and are collected in a special daily schedule. In managing the response cost, the attitude of the educator should be firm, not punitive, and he must take care to explain clearly why a point is taken away, without adding redundant and overly personal comments: *"You lose a token for interrupting your task"*, avoiding explanations of return as

*"You see, you're always the same, I'm taking away a token. If you go on like this you won't get your stickers today either"*.

You can also use the time out technique as a means to curb angry, aggressive behaviours in particular. This consists in placing the child in a neutral space where he waits for a signal, deprived of gratification, attention or satisfaction.

### 3.SUPPORT

---

The aim of this section is to review the most relevant teacher training programs for improving their knowledge and skills in ADHD management.

### 3.1. A description of relevant teacher training programs, with a focus on the impact that the application of a teacher training have on perception and management of problematic behaviors (ITD, UAEI)

A lot of studies have found that classroom-based interventions have a positive impact on the classroom behaviors of children with ADHD symptoms and to a lesser extent on their academic progress (Purdie et al., 2002). It strongly felt the need for support and training teachers and other professionals who have daily contact with children.

The lack of training is the barrier most frequently indicated by teachers in the process of working with ADHD students (Reid, Vasa, Maag, & Wright, 1994). Nevertheless, in spite of high demand for educational in-service training, teachers are not systematically trained to use the classroom management and teaching strategies and their knowledge about ADHD and experience of teaching a child with a diagnosis of ADHD is predictably variable. This is an interesting contrast with the US scholastic contexts where most teachers declare to have experience with ADHD children. In this context, teachers are trained to acquire an awareness of the ADHD behavioral problems and of their possible reasons, to adopt classroom accommodations, to manage their stress and communication and families, to apply the most suitable behavioral management strategies and implement behavior plans (NICE Clinical Guidelines, 2009). It would be desirable that this same attention was spread everywhere. Moreover an involvement of teachers in the treatment process and the implementation of distinct didactic elements and well-structured principles of behavior therapy in the school lessons should be strongly taken into consideration to allow all children and young people, including those with ADHD, to experience a more inclusive school.

Concerning a better management of communication, an interesting study of Geng (2011, p. 17) investigate the role of teachers' verbal and non-verbal strategies for managing ADHD students' behaviors in classroom.

He state that *"the way in which teachers talk is crucial in gaining the students' attention and that strategic teachers' talk can result in students calming down or communicate better with the ADHD students"*. For this, it would be desirable to train teachers how to manage their stress levels by learning to use effective verbal and non-verbal strategies such as voice control, short phrases, repeated instructions, using students' names, visual cues and verbal instructions combined.

This is another result that leads us to recognize that increasing the knowledge base and capacity of teachers to manage and teach pupils with special educational needs is the key to raising the achievement of these pupils.

Behavioral teacher training programs based on social learning principles provide teacher with specific behavioural techniques including, praise planned ignoring and classroom based contingency programmes similar to strategies provided to parents during parent training. Classroom interventions may also include strategies aimed at preventing adverse behaviour occurring e.g. classroom rules presented to the whole class or reducing the length of time children with ADHD are required to stay on task. The length of time required can then gradually increase as children's ability to remain focused improves.

In general, the most part of Teacher Training Program (TTP) is focused on the learning of managing academic activities and the strategies to adapt the organization of classroom environment. Cooper and Ideus (1996) give a description of a wide range of strategies useful to manage children with ADHD at school, as summarized in the table below.

### **Strategies for adapting physical environment**

- Reserve quiet working area
- Isolate the child from the class for a short time when they are misbehaving
- Seat the child in a place that is relatively free from distraction (for example, doors and windows) in a position where the teacher can easily intervene if the child is not attending.

### **Strategies for managing academic activities**

- Provide engaging activities
- Give clear and concise instructions
- Provide regular timetable
- Avoid routine tasks
- Breakdown a task into small steps
- Promote peer learning activities rather than group activities
- Use frequent positive feedbacks
- Give points or tokens as rewards to use up later for a favorite activities or treats -  
Take away points or tokens for misbehavior.

Strategies useful to manage children with ADHD at school (Cooper and Ideus, 1996)

The **Multicomponent teacher training** (Barkley, 2000) consists of a teacher-training program intervention combined with a parent and child interventions. Parents are trained in the same way as the teachers are by a child psychologist. In particular, teachers follow the instruction of a expert teacher and child psychologist regarding the different behavioral treatments to employ in classroom.

The training activity guides teachers to know defiant behaviors but also how to apply a behavioral strategy (setting up a home token system, rewarding children for non-disruptive behavior, time out, response cost and managing children in public places with ‘think aloud-think ahead’ strategies) to misbehavior. The program sessions take advantage of special treatment classes where the parent can try the application of strategies. A slightly modified version of Barkley’s parent training program applied to the Swedish context is the “Strategies in Everyday Life” (Ostberg and Rydell, 2012).

The **Irvine Paraprofessional Program** (IPP) (Kotkin, 1995) is a school-based reinforcement program composed by 12 week intensive intervention in a general education classrooms. The program includes (a) direct intervention with children with ADHD by specially trained paraprofessionals, (b) teacher consultation by the school psychologist on the use of effective classroom management strategies, (c) school-based reinforcement, and (d) social skills training out of class. The experts as facilitators help teacher during the lesson to apply the behavior management strategies and a token economy with the intention to fade out their presence by the end of the program.

The results of preliminary studies show a reduction of 50% of disruptive behaviors among students with ADHD after the classroom intervention. Moreover, positive changes in the application of strategies have been observed also without the presence of experts.

The **Promoting Academic Success in ADHD Students** (PASS, DuPaul et al., 2004) is an assessment-based, school intervention package (e.g., instructional modifications) aimed at modify the instructional methods adopted by teachers for improving the reading fluency, reading comprehension, math fluency and math problem solving of elementary school children with ADHD.

The **Multicomponent program** of Miranda et al. (2002) is another effective program for treating ADHD pupils, carried out by teachers in a classroom context. It includes:

- A first training session dedicated to general knowledge about ADHD.
- The second and third sessions during which teachers received training on behavior modification procedures
  - A fourth session providing teachers with guidelines concerning instructional management procedures for students with ADHD that would complement the individual demands of these students and that would improve their learning.
- A fifth and sixth session dedicated to cognitive behavioral techniques. In particular teachers are trained in the use of self-instruction (Session 5) and reinforced self-evaluation (Session 6) techniques that may be applied to the whole class, during this session.

According to the **Portuguese vision**, the findings are undivided in reporting that generally teachers' initial and continuous professional training aimed at delivering a positive teaching performance to children with ADHD is inadequate (Fernandes, 2007; Filipe, 2011).

Teachers comment that, despite being aware of ADHD they have limited information (Espada, 2011) and because of this teachers have doubts about this health condition, specifically, in the diagnosis criteria, its etiology and – the most important concern – about the strategies to teach and deal with children with ADHD in classrooms (Pereira, Franco, & Ferreira, 2009).

One other key finding is that the number of school psychologists has been reduced compared to the need to provide multidisciplinary teams for the adequate support to help to provide these children with what they effectively need. The school web, concerned with ADHD, is unable to respond adequately to these children's needs, the integration is limited to the simple insertion of these children/ students into a common classroom (Fernandes, 2007; Filipe, 2011).

The positive outcome however is that teachers show both tolerant attitudes and coping skills to use in their daily work with ADHD children (Espada, 2011).

Teacher training programs in Portugal usually assume the format of in-service training programs. They have to be accredited by a national council that assesses the quality of the program. Nevertheless, there is limited information about the implementation and effects of these training programs. One example is the training program implemented by Leal and Dias (2010). They implemented a program with 20 teachers and 20 children from 19 different schools in the north of Portugal. The program covered the following issues: - General knowledge of ADHD – Characterization, Etiology, Diagnostic, Self-concept and Relationships with the ADHD child.

- Interventions in ADHD – Pharmacological, Behavioural, Mental-behavioural and Multimodal.
- Interventions in School Context – Teacher s attitude, Physical changes, Classroom Management, Educational environment, Behaviour Problems, Academic performance problems: attention, reading, writing, mathematics and oral language problems.
- Intervention strategies in ADHD – Intervention Strategies in Behaviour Problems and Intervention Strategies in Academic Performance for: attention, reading, writing, mathematics and oral language problems.
- Reflection and analysis of the interventions (developed in each session).

The authors based their research on the effects of the training in qualitative data and not on any kind of quantification that allows us to infer a change in the attitudes of the teachers concerning these studies, but not necessarily on their practices and especially, in the result of these practices.

Sanches-Ferreira et al. (2012) conducted a teacher-training program in the development of individual education plans based on the students' assessment performed using the ICF framework, which was designed to support active and constructive learning. The evaluation of these training program products showed its efficacy for changing or improving teachers' practices. Among the different research-based teaching models, independent of the content, there is a consensus in using the following criteria for structuring teacher-training programs:

- Practical demonstrations
- Oriented-practices
- Autonomous practice
- Reflection

Sanches-Ferreira et al. (2012, in press) used these criteria to structure a 50-hours teacher training program, divided in two 25-hours parts, one of instructive group training sessions (6 sessions) and the other of field work. The structure outline of the instructive group training sessions provides a comprehensive account of the teaching and learning process used:

1<sup>st</sup> Session: Theoretical background-Activate the previous knowledge of learners and the introduction of new knowledge, materials and practices.

2<sup>nd</sup> Session: Modeling learners' practices – demonstration; thinking aloud strategy (put questions and strategies to solve them) and asking for the learners' active participation.

3<sup>rd</sup> and 4<sup>th</sup> Sessions: engage learners in supervised practice - Analysis of a case history in small working groups (4/5 elements) with the aim to practice and generalise new knowledge into daily routines

5<sup>th</sup> and 6<sup>th</sup> sessions: Presentation of an individual's work to share information with other learners; Engage learners in natural practice and provision of feedback.

In all the instructive training sessions teachers were given assignments to provide opportunities to put into practice (field work) the new learning each from the session. At the beginning of the following session, teachers were asked to present the results from the previous assignment they had introduced.

**CE.D.AP.** (Italy) has been working for years in schools and has prepared its own operative model. This consists of an integrated approach that combines on-going training with intervention in the classroom, where the expert acts as both support and model for the teacher. This proposal can be varied according to the needs of the school, reducing or increasing the estimated hours. Generally we have found that for the work to be effective 81 hours of training are required. This is subdivided as follows over the school year:

- 15 hours of initial observation in a sample class, divided into: 9 hours of casual observation and 6 hours of structured observation of the internal classroom dynamics. This observation is carried out using grids identifying problem behaviours and based on the scheme ABC (antecedent, behaviour, consequence) for the compilation of the initial baseline.
- 6 hours of structured observation in the classroom for the final baseline.
- 15 hours of teacher training in group settings (group supervision).
- 15 hours of theoretical training.
- 30 hours of intervention in the sample class. In this context, strategies identified during supervision meetings of dealing with specific problems are tested. Then, the expert supports teachers in the classroom by acting as a model in the management of certain situations, for example by setting up a token economy in the classroom, etc. The presence of this supportive figure will be progressively reduced, allowing the teacher to take charge and work on his/her own.

The hours of teacher training are divided into two specific periods, one spent in theoretical training and the other in supervising the class committee of the sample class chosen by the school. The general training proposes the following programme, which is divided into 4 modules:

1st module: teacher stress and cognitive restructuring

Training starts by considering teacher stress and abilities of empowerment to deal with it. This is both from a theoretical and practical point of view. Efforts are made to understand the causes and effects of this stress, with an important distinction between positive and negative stress. Then teachers make a self-assessment of their level of occupational stress. They assess their typical reactions to stressful situations and of personal features that contribute to their stress.

Once it is recognized that stress exists and that it is possible to deal with it, groups are formed to find strategies for managing it, focusing on overcoming negative emotions and transforming irrational thoughts into rational ones. The methodology of intervention uses different techniques, mainly derived from Rational Emotional Therapy (RET) by A. Ellis and from the cognitive-behavioural model.

2nd module: assertive communication

During the next stage attention focuses on the best strategies for managing communication with colleagues and families. An analysis is made of passive, assertive and aggressive communication styles to identify the different

styles used in conducting a class (passive, authoritative and authoritarian teaching styles). Teachers are trained to recognize the style behind every communication and to learn to conduct an interview in an assertive manner, through role-play and group games.

### 3rd module: the laws of learning for effective class management and motivation of difficult pupils

All the techniques that a teacher may use for effective class management are analysed. The teachers try to identify specific management problems posed by children with behavioural disorders and with the help of an expert, look for solutions that can be tested in the classroom. Meetings with teachers are based on behavioural assessment and functional analysis, in order to identify problem behaviours and select which alternative behaviours to teach.

In particular, approaches are suggested for introducing educational interventions that can be used with the identified problems. Teachers are then able to experiment with tools and strategies of interventions such as classroom organisation working times to improve teaching and learning processes with difficult or hyperactive pupils. They can also learn to use a points system to reinforce appropriate behaviours in the classroom.

The following topics are taken into consideration:

1. Comprehension of the problem
2. Preparation for change
3. Observation and functional analysis of behavioural problems
4. Problem behaviours: intervention regarding antecedents
5. Intervention regarding consequences
6. Application of a Token Economy (points system)

Furthermore, laws of learning for effective class management are discussed. - Classical and working conditioning - Reinforcements and sanctions.

### 4th module: intervention with difficult pupils and class management: operative strategies

- Class management: operative strategies
- Structuring of routines (entering school, playtime, introduction of daily activities, agreeing on breaks, dictation of homework assignments, greetings and modalities for leaving the classroom, etc.) - Preparing a poster displaying classroom rules.
- Setting and anticipating working times (using symbols relating to working time and difficulties) - Organising school materials
- Planning free time and transition situations (breaks, change of teacher between one lesson and another, moving from one place to another, beginning and end of lessons)
- Structuring lessons and suggestions for teaching
- Establishing behavioural contracts
- Teaching pupils new appropriate actions
- Learning about and applying a token economy
- Monitoring and assessing interventions carried out
- Teaching children new appropriate actions
- Final assessment

The contents of the course program are organised with emphasis on the practical application of methods of self-evaluation and self-knowledge. Teachers are also given the opportunity to report on their daily experiences.

It's clear that the training has a key role to offer. Teachers who had specific ADHD training were more knowledgeable about ADHD than their less educated counterparts. Still today, teachers felt the need to acquire more knowledge of the disorder and also to be helped to challenge all the misconceptions related to it. Besides, it is easier to develop favorable attitudes where there has been uncertainty or an acknowledged lack of knowledge than where a false belief has been held.

3.2. *A description of representative assessment tools employed to evaluate the perception of teachers, their self-efficacy, etc.*

---

The **Knowledge about Attention Deficit Disorder Questionnaire** (KADD-Q)(Sciutto et al., 2000) is a 41 item rating scale aimed at measuring teachers' knowledge and misperceptions of ADHD in three specific areas: symptoms/diagnosis of ADHD, general knowledge about the nature, causes and outcome of ADHD and possible interventions with regard to ADHD. The responses of correct, don't know, and incorrect to the questions indicated, respectively, knowledge, a lack of knowledge and misperceptions concerning ADHD.

The **Student- Teacher Tension Checklist**(STTC)(Greene, Marchant, & Beszterczey, 1997) lists DSM-IV behaviours for ADHD and ODD. Teachers are asked to indicate the extent to which these behaviours frustrate them on a scale from 1 (the behaviour causes no tension or frustration) to 5 (the behaviour causes extreme tension or frustration).

The **Index of Teaching Stress** (Greene et al., 1997) was originally developed to be a teacher version of the Parenting Stress Index. Teachers respond to the questions about a target child. The questionnaire contains two parts: Part A lists common child behavior problems, teachers are asked to core the frequency of behaviors for a particular child and Part B of the questionnaire asks teachers about the impact of a student's behavior on teaching efficacy and satisfaction in their teaching role (Greene et al., 1997). This may therefore provide a useful measure of the teacher-child relationship.

## FAMILY CONTEXT

---

EDITED BY ALL PARTNERS COUNTRIES

### 1.ASSESSMENT

---

The aim of this section is to review theoretical issues about the ADHD behaviors in the family context, to identify behavioral/functional clusters and to collect tools (i.e. observation charts, rating scales, questionnaires, etc.).

*1.1. Relevant studies about ADHD behavior at home, including the behaviors of parents and the interaction between parents and ADHD subjects (Eds. by all partners).*

---

Typically, children with ADHD are reactive, non-compliant with parental instructions, have difficulties with self-regulation, emotional and attentive states, unpredictable and impulsive. All of these behavioral traits sorely test the responsive activity of parents. Their ineffective parenting is often attributed the cause of the negative behaviors of their child. Parents in such stressful situations could develop anxiety, depression, partner conflict, violent reactions, poor self-efficacy, etc. Evidently these parents need support to manage problems that may arise on a daily basis (Kashdan, 2004).

It is therefore necessary to properly identify the variables that affect the relationship between the child with ADHD and the parents within the family context to define an effective psychoeducational intervention. The description of some studies from the international literature, reported thanks to the collaboration of all partners, will help us to better understand the dynamics involved in the family context and possible strategies to improve them.

Klassen and colleagues (Klassen et al., 2004) show how the symptom severity and the presence of multiple comorbid disorders have a significant impact on emotional-behavioral role function, behavior, mental health,



and self-esteem of children. They have also a significant impact on the parents' emotional health and parents' time to meet their own needs and affect family activities and family cohesion.

A comparison study (Foley, 2011) between families with ADHD and without ADHD children demonstrates how the levels of family dysfunction (defined as an ineffective functioning in the areas of communication, relationships, and problem solving) inside the family unit are higher in families with the presence of ADHD children.

Johnston and Jassy (2007) found that the presence of severe and inconsistent responsive actions of parents seems to contribute to the development of oppositional behavior and conduct problems in children with ADHD. Childhood ADHD acts as a stressor that enhances the occurrence of the parenting difficulties commonly associated with child oppositional/conduct problems. The presence of these comorbid conditions occurs in 30% to 60% of cases (Biederman et al., 1991).

Parents show an overall negative behavior characterized by directive commands, little use of rewards, and the use of disapproving attitudes. They are often unable to read the child's cues promptly or reply with an accurate response providing them the necessary scaffolding for enhancing their self-regulatory skills. The impulsive and unpredictable actions often adopted by parents when interacting with a child leads them to an increase of the child's frustration and negative reaction providing the basis for learning oppositional and coercive behaviors (Johnston & Jassy, 2007) An ineffective responsive practice with "*less than optimum consistency (e.g., giving in to the child), with over-reactive discipline (e.g., angry outbursts), or with inappropriate withdrawal from the child (e.g., avoidance of interactions)*" (Johnston & Jassy, op. cit., p. 75) leads to an ineffective interaction.

Besides, inappropriate, harsh discipline (e.g., physical discipline, verbally aggressive discipline) and immature behaviors (e.g., hostile behavior, power struggles) contribute to harsh and otherwise ineffective parenting (Arnold et al., 1993).

Another risk factor is parents' incoherence, which they display initially in an effort to convey a direction (e.g., firmness of direction), they then use it in response to initial opposition (e.g., give in or remain firm in the face of noncompliance), and when they face of persistent defiance from the child (e.g., flexibility in changing discipline strategies) (Garstein & Fagot, 2003; Vigilante & Wahler, 2005).

Parents' stress is also increased due to sleep-related problems. In fact, most children with ADHD have sleep problems (Sung & Hiscock, 2008) which include difficulty falling asleep (delayed onset sleep or bedtime resistance); difficulty staying asleep (frequent nocturnal awakenings or restlessness); snoring and sleep apnea, restless leg syndrome, and periodic limb movement syndrome.

However, **CEDAP (IT)** highlights how protective factors such as good co-parenting and a healthy attachment can influence the quality of care and rising of children.

The Co Parenting is a construct describing a form of parental relationship among adults aimed to capture "*the solidarity and support between the co-parental partners, the extent of dissonance and antagonism present in the adults' co-parental striving, and the extent to which both partners participated actively in engaging with and directing the child*" (McHale, et al., 2004, p. 222).

Recent research (Gable, Belsky, & Crnic, 1994; Harvey, 2000; Benedetto & Fazzari, 2010) suggests that the degree of similarity of interparental values, beliefs and educational practices is an important factor that can contribute to the development of the child.

Studies have shown how the dynamics of co-parenting is particularly significant in families with children with ADHD. Harvey (2000) explores the relationship between similarity of parenting and comorbidities internalizing and externalizing problems in children with ADHD. The results reveal that the similarity of parenting has been associated with a better fit and fewer family marital conflicts as well as to lower parental stress.

The results of this study affirm that children with ADHD are less tolerant of inconsistency between the parenting style of the mother and the father. Because they have difficulty in self-regulation and are more dependent on external feedback to adjust their behavior, compared to control children. It has been found that uniform external feedback, without contradictions, can help prevent the development of problems of comorbidity such as oppositional defiant disorder or the manifestation of anxiety.

The quality of attachment relationship between parent and child and the occurrence of traumatic events during the first months of life have a profound influence on mental health development of individuals. Bailham and Harper (2004) indicates that secure attachment has a positive effect on specific areas of expertise in which children with ADHD show difficulty. According to this model, the treatment for ADHD must necessarily take into account the entire household.

The **ADDISS partner (UK)** review highlights other important aspects such as the early appearance of dysfunctions in family dynamics. In fact, adverse familial environments are common in ADHD families and difficulties in parent-child relationship are likely to begin early.

In a sample of pre-school children aged between 3-5 with ADHD, parents reported higher levels of stress compared to non-ADHD controls and greater family dysfunction. In observations of parent-child interactions children with ADHD were observed to display more problem behaviour and be more non-compliant especially during structured tasks. In response, parents were more likely to display negative behaviour towards their child particularly when asking their child to complete a task (DuPaul, 2001). It is likely that parent and child behaviours interact so that parents respond to negative child behaviour in a way that serves to maintain or exacerbate child behaviour further. For example, Johnston & Jassy (2007) propose that the early characteristics of ADHD affect a parent's ability to engage in optimal parenting resulting in child frustration and the development of co-morbid behavioural problems in ADHD.

It may therefore be important to target parenting behaviours in children displaying early signs of ADHD. Indeed Keown (2012) found that aspects of observed maternal and paternal parenting during pre-school were associated with the later levels of inattention and meeting diagnostic criteria for ADHD 3 years later (after controlling for pre-school levels of ADHD symptoms and conduct). Therefore, despite the stability of ADHD behaviours overtime, parenting behaviours may make a unique contribution to ADHD symptoms up to 3 years later.

In a large European survey comparing parent reports of the impact of child behaviour on family functioning in families of children with ADHD and children without ADHD, Coghill and colleagues (Coghill et al., 2008) found that parents of children with ADHD report that children display challenging behaviours during homework tasks, whilst following family routines and whilst playing with other children. Parents also report that their children are more noisy, show disruptive behaviour, are less organised and more demanding and present attention seeking challenging behaviour which lasts throughout the whole day. In addition, parents of children with ADHD report that their child's behaviour has a negative impact on parent-child relationship. Parental psychosocial adversity is also common in ADHD families. Due to the high heritability of ADHD it is also likely that some parents will have high levels of ADHD symptoms themselves. High parental ADHD associated high levels of family chaos and therefore parents with high levels of ADHD symptoms may benefit from additional support with planning and organisation (Johnston et al., 2012). Parents are also likely to report higher levels of depression (Chronis et al., 2003). It is known that parental depression is associated with higher levels of negative and hostile parenting and lower levels of positive parental involvement (Lovejoy et al., 2000). Chronis et al. (2007) investigated the effects of maternal depression and early parenting on the development of conduct problems in children with ADHD. Analyses revealed that in addition to initial levels of conduct problems, early levels of positive parenting and maternal depression predicted the level of future conduct problems in that child.

The **Portuguese partner (UAEI)** refer to studies which examine a variety of variables – directly or indirectly – related to the family context, such as: parental stress and social support; parental styles; guidelines for the development of a parental training program; and also, the sleep pattern of children with ADHD.

In a study aiming to evaluate the relation between the stress perception and the satisfaction with social support (Moreira, 2010), 110 parents of children with ADHD showed that these two variables are inversely correlated, what means that when the social support increases, the levels of stress fall. The perception of social support is directly related with gender, being lower for mothers than for fathers. The stress perception oscillates as a function of parents' age, being higher in older parents. Social support perception is related with the time since

ADHD was diagnosed, decreasing as time passes. The results strengthen the importance of social support in the decrease of stress levels and promote the importance of interventions to strengthen social support nets. In a similar study with 30 mothers of children with ADHD, Santos (2008) have showed that these mothers experienced higher levels of parenting stress and used less parenting control practices. Parenting practices do not differ on the basis of the child's age or gender, but there are some differences in the case of parenting stress. Mothers who experience higher levels of stress related to the child's characteristics use more parenting rejection practices. The results suggest the importance of taking into account the type of educational practices and parenting stress experienced by this target population, given their potential adverse effects on the child's development.

*1.2. An overview of assessment tools used by the partner countries in school context*

---

Parents have a fundamental role in the assessment process of children and adolescents presenting with concerns about ADHD. The history and the evolution of a child is well known to its parent. According to Barkley (2013, para. 5) *“whether wholly accurate or not, parent reports provide the most ecologically valid and important source of information concerning the child’s difficulties. It is the parents’ complaints that often lead to the referral of the child, will affect the parents’ perceptions of and reactions to the child and will influence the parents’ adherence to the treatment recommendations to be made. The assessment carried out in the family context represent an obvious source of highly descriptive information about the child and family, revealing the parents’ particular views of the child’s apparent problems and narrowing the focus of later stages and components of the evaluation. It can readily reveal the degree of distress the child’s problems are presenting to the family, as well as the overall psychological integrity of the parent. Hypotheses as to the presence of parental personality or psychiatric problems (depression, hostility, marital discord, etc.) may be revealed that will require further evaluation in subsequent components of the evaluation and consideration in formulating treatment recommendations”*.

According to the previous classification (see chapter on Assessment) the assessment tools used in each partner country are listed in the table below. In this way will be possible to highlight the specific method used by them in the family context and then understand how the Project could empower the method of Functional assessment.

TOOLS USED IN FAMILY CONTEXT	UAEI (PT)	ADDISS (UK)	CEDAP (IT)
------------------------------	--------------	----------------	---------------

<b>Conners Parent and Teacher Rating Scale-Revised (CPRS-R/CTRS-R) (Conners, 1997)</b>	x	x	x
<b>CASS:L – CRS-R for adolescent (Conners, 1997)</b>			x
<b>SNAP-IV (Swanson, Nolan and Pelham, 1998)</b>		x	x
<b>Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997)</b>	x	x	x
<b>Child Behavior Checklist (CBCL) (Achenbach, 1991)</b>			x
<b>Brown Attention-Deficit Disorder Scales for Children and Adolescents (BADDs) (Brown, 2003)</b>			x
<b>Parenting Stress Index (PSI) (Abidin, 1983)</b>	x		x
<b>Kiddie - Schedule for Affective Disorders and Schizophrenia Present and Lifetime version (K-SADS-PL) (Kaufmann, 1997)</b>			x
<b>Egna Minnen Beträffande Uppfostran (EMBU-P) (Perris et al., 1980, revised by Castro, Pablo, Gómez et al., 1997)</b>	x		
<b>Social Support Satisfaction Scale (Ribeiro, 1999)</b>	x		
<b>Life Experiences Survey (Sarason, Johnson e Siegel, 1978)</b>	x		



x

**Attention-Deficit Hyperactivity Disorder Evaluation Scale (EDAH)** (Lopes, 2008; AllenGomes, Lopes and Silva, 2010)

**Adult-Adolescent Parenting Inventory (AAPI-2)**  
(Bavolek & Keene, 1999)

**Parenting Styles Inventory**(Gomide, 2006)

**Beck Depression Inventory (BDI)** (Beck, Ward, Mendelson, Mock & Erbaugh, 1961)

**Questionnaire about sleep-wake patterns** (adapted from Clemente et al., 1997)

**Scale per l'individuazione dei comportamenti di Disattenzione e Iperattività (SDAG – SDAI - SDAB)** (Marzocchi, Re & Cornoldi, 2010)

**Scala per l'Identificazione Precoce del Disturbo da Deficit di Attenzione e Iperattività in età Prescolare (IPPDAG)** (Marzocchi et al., 2002)

**Questionario sindromi Compresenti (COM)**  
(Cornoldi, Molin, & Marcon, 2004)

**Scala per la valutazione dei Comportamenti Dirompenti (SCOD)** (Marzocchi et. al., 2001)

**Senso di competenza dei genitori** (Vio et al., 1999).

**Parent Scale** (Arnold et al., 1993; Impalà, 2005).

**Parent Problem Checklist** (Dadds and Powell, 1991)

**Children's Global Assessment Scale (C-GAS)**  
(Shaffer et al., 1983)

**Five Minute Speech Sample (FMSS)** (Daley, Sonuga-Barke, & Thompson, 2003)

x

x

**Alabama Parenting Questionnaire** (Frick, 1991)  
**Parenting Sense of Competency Scale (PSOC)**  
(Johnston & Mash, 1989)

x

**Family Strain Index (FSI)** (Riley et al., 2006)

**General Health Questionnaire (GHQ-12)**  
(Goldberg and Williams, 1988)

*Note: all references cited in this table are collected in the References section: Assessment Tools*

## 2. INTERVENTION

---

The aim of this section is to review strategies of intervention in the family context to face problematic behaviors (i.e. difficulty with homework, organization of tasks and activities, and coordination of motor movements, etc.).

### 2.1. *Relevant studies about the intervention strategies to manage problematic behaviors at home*

---

Parents have to understand that the specific dysregulation of emotion, motivation and self-discipline of their child at home is due to the presence of the disorder and that child doesn't want to react inadequate, suffer from its faults (as does the parent!). So, it's important to create a positive climate to ensure that each member reach their full well-being in the family context. Parents with an adequate support can learn to react promptly, but relaxed, to reinforce immediately the positive behavior, and understand that punishment or negative consequences worsen the interaction and self-esteem.

In the following section are described several strategies to enhance communication, better relationships, and problem solving strategies in the management of ADHD at home.

**Responsive parenting practices** is a term referred to the ability of parent to comprehend the meaning of a child's cues and respond in a firm, consistent and sensitive way according to the needs of the child (Zeanah, Larrieu, Heller, & Valliere, 2000). For example, responsiveness, including positive involvement, scaffolding, and emotional support, has been associated with greater child compliance and competence and lower risk of child disruptive behavior (Ipsa et al., 2004; Landry, Smith, & Swank, 2006; Martinez & Forgatch, 2001; Wakschlag & Hans, 1999).

**Positive discipline practices** are referred to constructive strategies that parents apply to support their children "to develop age-appropriate behavior regulation skills and to internalize rules and norms, often through instruction and contingent responding". It includes the ways as how parents track and respond to the child's level of compliance/misbehavior (consistency, punishment) (Sanders, 1999).

**Yoga meditation techniques, and mindfulness methods** are methods used as family treatment in parents and children. Yoga meditation shows ADHD children benefits at home (better sleep patterns, less anxiety) more disposition to concentration and less conflict at school. Parents reveal less stress and more ability to manage children behavior. (Brown & Ryan, 2003)

Some of different intervention practices in family are described in the following web sites:

1. The "WebMd" highlight some common strategies that parents can adopt to manage the behavior of ADHD children. These behavioral management techniques are described according to the age of subject: preschoolers (Age 5 and Younger), children Ages 6-12 teens.

*Web site resource.*

<http://studentsfirstproject.org/wp-content/uploads/Home-and-Family-ADHD-Strategies.pdf>

2. Strategies to improve the well-being of family and quality home life of children are suggested in terms of tips for family life, strategies for managing ADD/ADHD children in terms of effective communication, action plans for maintaining the life space, improving organization and time management, using reward systems to promote good behavior, positive relationships, promoting physical exercise, diet and nutrition suggestions.

*Web site resource* <http://hsana.org/education/Parenting a Child with ADD.pdf>

3. In a document related to the ADHD disorder the “Students FIRST Project” web site summarizes specific home and family strategies that parents can apply with their children for managing Inattention, Disorganization, Impulsivity and Hyperactivity.

*Web site resource* <http://studentsfirstproject.org/wp-content/uploads/Home-and-Family-ADHD-Strategies.pdf>

4. The ADD/ADHD Parenting Tips section of helpguide.org web site summarizes some helpful positive strategies for guiding children into a more effective control and reduces of symptoms. tip 1: Stay positive and healthy yourself tip 2: Establish structure and stick to it tip 3: Set clear expectations and rules tip 4: Encourage movement and sleep tip 5: Help your child eat right

tip 6: Teach your child how to make friends

*Web site resource.* [http://www.helpguide.org/mental/adhd\\_add\\_parenting\\_strategies.htm](http://www.helpguide.org/mental/adhd_add_parenting_strategies.htm)

5. Beth W. Orenstein summarize 10 Behavior management strategies for stimulating good behavior and environmental strategies for favoring sleep in ADHD children.

1. Define the house rules.
2. Give immediate rewards and consequences
3. Provide frequent feedback
4. Be consistent
5. Establish routines
6. Create checklists for routine activities.
7. Using timer and clock alerts
8. Create a reward system
9. Focus on the positive action of child.
10. Action plan for problems

Strategies for sleeping problems

1. Create a bedtime ritual.
2. Make calming down part of that ritual.
3. Unplug before bedtime.
4. Create an environment conducive to sleep
5. Reserve the bedroom and the bed mainly for sleeping.
6. Encourage self-soothing
7. Enforce a consistent sleeping and waking schedule
8. Cut out caffeine and sugar.
9. Treat medical issues.
10. Praise successful sleep.

*Web site resource.* <http://www.spark.org.sg/newsletter/nwsltr-22.pdf>



6. According to the **experience of ADDISS** behavioral family interventions can be tailored to focus on specific behaviors that parents may find stressful (e.g. completing homework). In homework focused interventions parents are taught strategies to help them develop a consistent homework routine with their child, for example, by having set homework time in a quiet setting with little distraction and helping the child with homework if they need it. Parents could also reinforce homework completion with rewards. Raggi and colleagues (Raggi et al., 2009) have tested the Homework Intervention Program within a small sample of parents and young adolescents with ADHD (age 11-13 years). In this intervention parents are taught behavioral strategies and are encouraged to work collaboratively with their child to set a homework management plan, goals and rewards. Sessions also included strategies aimed improving the organisation of homework materials in order to aid homework completion. At post-intervention, 8 out of 11 participating adolescents had clinically significant improvement in parent-reported homework problems. In addition 64% of parents reported significant improvement in levels of inattention in the home (ibidem).

## *2.2. Educational and behavioral strategies for parents in Italy (Ce.D.Ap.)*

---

It is good practice during parent training to teach parents to support positive behavior and reduce negative behaviors through the use of effective reinforcement schedules, rules and cost of negative choices. In daily practice most parents focus their attention on the undesirable behaviors of their children disregarding positive ones. This attitude leads the parent to develop feelings of inadequacy, despair, anger, frustration and that nothing is going well. The use of severe and inconsistent response actions promotes the consequence of damaging the relationship between child and parents and can create the onset and development of reinforcing oppositional behavior. This is a vicious circle of negative reinforcement of thoughts and feelings. Finally an attempt at attention seeking manifested by a child through misbehavior, leads the parent to adopt reprimands that could act as negative reinforcements, which will lead to an increase in the frequency of the inappropriate behavior, rather than a reduction of them.

It is important to explain to parents the importance of changing their focus of attention from negative behaviors to focus on positive behaviors of the child. In order to encourage this change the family must understand the dynamics of the underlying this attitude, often derived from their personal culture or learned educational styles. The first step is a change in the nature of the parent to counter their own ineffective interaction style and their own "folk theory", which shows in the form of their "mental set" or "tradition" and that guide their behavior. It may be useful to learn and "memorize" types of verbal praises for positive behavior (e.g., "I really liked it when you helped your brother to pick up toys and put them in the basket"; "You have done this work very well. I see that you read the assignment and paid attention to the teacher's suggestions of checking at the end to see if there was a mistake, well done!")

In addition the parents have to learn how to control their experiences and emotions day by day in order to provide and convey effective education messages to their children. Finally they have to be able to apply the reinforcements in order to enhance the desired behavior and increase their occurrence in the future. Marzocchi and colleagues (Marzocchi et al., 2011) highlight the following conditions for using reinforcements:

- to use reinforcements immediately after the occurrence of a desirable behavior
- to progressively substitute contrived reinforcements for self-sustaining natural reinforcers
- to regulate the amount of reinforcement according to the difficult and effort required by the behavior
- to indicate clearly and explicitly that the behavior is praised ("you have been accurate and you have checked your work", rather than "I'm happy because you have been good")
- to show enthusiasm when reinforcing by smiling and emphasizing the positive comments
- to avoid the use of rewards to stop undesirable behavior (otherwise what is the problem behavior is then being negatively reinforced)
- to maintain the highest consistency in giving reinforcement. If the behavior is not what I expected, the reinforcement should not be given
- to establish intermediate steps specifically for behavior that requires much effort to be achieved by the child. The achievement of an step can be reinforced

- to make sure to have a large "menu" of rewards to prevent the child from being saturated by the same reinforcement
- what works as a reward for a child may not work for another child
- in the same child, what worked as a reinforcement on one occasion, may not work the same way on other occasions;
- a reinforcement loses its value if it is used too often
- the adult should control access to the rewards that it intends to use as reinforcement (if the child may have certain things whenever they want, these things will have little effect as reinforcement). *Extract from Marzocchi et al. (2011).*

### 3. SUPPORT

---

The aim of this section is to review the most relevant parental training programs for improving their knowledge and skills in ADHD management.

#### *3.1. A description of relevant parent training programs, with a focus on the impact that the application of a parent training have on perception and management of problematic behaviors*

---

All the above-mentioned practices are foundations to structure effective Parent Training (PT) programs from. Below is a list of the most popular programs in the international literature (Eds. by ITD) followed by descriptions of the PT programs used in the different partner countries involved in the WHAAM project. Parent training programs are aimed to provide parents knowledge about ADHD and improve skills to manage ADHD behavior (inattention and hyperactivity-impulsivity) of their children. The programs vary in their format and content usually based on a step-by-step approach. They are generally manual-based and may include observation of parent-child interactions, supervisory tactics such as discussion and step-by-step evaluation of assignments and taught techniques, videotaped modeling, role-play, discussion. Parent training provides the best outcomes for parents of ADHD children between 4 and 12 years of age. Teens with ADHD do not respond well to PT due to the minor parental control over the meaningful events in their life. Other treatments, such as problem solving communication training could be taken into consideration (Barkley, 2006). Parent training includes teaching the practices of positive attending skills in human relationships; special time for positive parent-child interaction; teaching effective commands (i.e. use clear directions, not questions; have child repeat request; go to child, touch, and use eye contact, etc.); teaching parents to pay attention to non-disruptive child behavior; using a token economy, becoming predictable and encouraging ways for parents to reinforce their child's compliance; make child privileges linked to work; time out strategies.

Delivery methods:

- Interventions for individual parents or for a couple (usually 1 hour for each session)
- Group-based interventions (usually 1 hour and half)
- The combination of individual or couple and group interventions
- Parents acting as the main mediators of the intervention with an additional component involving teacher(s) trained in behavioural management.

Programs are usually delivered to parents' groups. They include 10 to 20 sessions. The length of the meetings is one to two hours. The topics of session encompass to the presentation of what is ADHD disorder and its effect on children behavior; how to recognize the symptoms; how to use positive discipline practices, reward system, ignoring unwanted behavior, time-out procedures, strategies of communication and collaboration between parents and teachers for planning ahead to anticipate problems.

The **Behavioral Parent Training** (BPT) (Pelham et al., 1995) is a program aimed to change and enhance the parenting style and the management of ADHD (e.g., Pelham et al., 1998). As described in Chronis (2004, p. 2) the typical sequence of sessions for Behavioural Parent Training (BTP) is:

1. Overview of the child's disorder, social learning theory and behavior management principles
2. Establishing a home/school daily report card/establishing a home behavior checklist/rewarding home and school behavior
3. Attending to appropriate behavior (e.g., compliance) and ignoring minor, inappropriate behaviors (e.g., whining)
4. Giving effective commands and reprimands
5. Establishing and enforcing rules/When...then contingencies
6. Time-out procedures
7. Home point system-reward and response cost
8. Enforcing contingencies outside of the home; planning ahead for misbehavior outside the home
9. Problem-solving techniques
10. Maintenance of program after weekly therapist contact ends.

The **Parent-Child Interaction Therapy** (PCIT) is an empirically supported parent-training program for young children with disruptive behaviors that may also be effective in treating ADHD. It is an individualized treatment for individual parents that employs modeling, in-vivo practices and provide on-line feedback. PCIT is based on both attachment theory and social learning theory (Eyberg, 1988). It is designed to be developmentally-sensitive for preschoolers between ages 2 and 7. It includes a relationship enhancement phase, child-directed interaction (CDI), a behavior management discipline phase and parent-directed interaction (PDI). It is based on data demonstrating mastery of concepts. PCIT training is generally delivered in approximately 10 sessions. The duration depends on parents' performance. PCIT includes live coaching in the session, which gives parents an opportunity to practice skills with their child and also receive feedback by the coach. The first phase is inspired on play therapy, parents are engaged in play led by the child "which in turn encourages them to create or strengthen their bond with their child, increases their use of positive parenting practices and enhances their child's social skills. Parents are specifically instructed in the PRIDE skills: Praising the child (labeled praise), Reflecting the child's statements, Imitating the child, Describing their child's behavior, and using Enthusiasm throughout their play and in avoiding questions, commands, and criticism. Before parents pass in the PDI phase they have to demonstrate they have learnt the skills.

The second PDI phase teaches parents to provide firm, consistent, and predictable discipline when necessary. This phase starts with instruction of giving effective commands that are both clear and direct so that they let the child know exactly what is expected. (Wagner et al., 2008)

Online resource <http://pcit.phhp.ufl.edu>

The **Barkley's program** is designed for parents of children ages 2–12. The program is supported by research evidence demonstrating "that up to 64% of the families seeking treatment for their child's ADHD report significant positive changes in their child's disruptive behavior" (Wagner et al., op. cit., p. 10). Steps extract from Barkley parent training program (Barkley, 2006):

- Program Orientation and Overview of ADHD
- Understanding Parent–Child Relations
- Improving Positive Attending Skills
- Extending Positive Attending Skills and Improving Child Compliance
- Establishing a Home Token/Point System
- Adding Response Cost
- Using Time Out
- Managing Behavior in Public Places
- School Issues and Preparing for Termination

- **Booster Session**

Program including role-play, videotaped modeling and discussion using a group-based collaborative approach.

The **MTA parent training group sessions** (Wells et al., 2000) is a part of an intensive psychosocial treatment (14-month) composed by a Parent Training component, a School intervention component and a Summer Treatment Program. It includes 27 group sessions (and 8 individual sessions).

Following the original description of the sessions:

1. Structured clinical interview, review of ADHD and introduction to treatment
2. Setting up school/home daily report card
3. Overview of social learning and behavior management principles and review of DRC
4. Attending and “special playtime”
5. Rewarding and ignoring skills in “special playtime” and “catch your child being good”
6. Using positive skills and Premack principle to increase targets: catch child being good and independent play
7. Giving effective commands to children, establishing behavior rules, and attending and rewarding compliance to instructions
8. Time-out procedure
9. Home token economy 1
10. Home token economy 2
11. Response cost
12. Planned activities training and setting generalization
13. Stress, anger, and mood management 1
14. Stress, anger, and mood management 2
15. Peer programming in home and school
16. Preparing for the new school year
17. Parent skills for academic/school support at home compliance.

Generalization and integration sessions:

18. Review of attending, rewarding, ignoring skills, review of “special time”
19. Review of commands, house rules, and time-out
20. Review of home token economy and response cost
21. Review of academic support/homework programs at home
22. Planning for the second summer
23. Review of the first scripted parent–teacher meeting
24. Review of the second scripted parent–teacher meeting
25. Review of the third scripted parent–teacher meeting
26. A final review of the scripted parent–teacher meetings
27. Preparing parents to coordinate work with the schools and problem-solving school issues.

The **Community Parent Education Program (COPE)** (Cunningham et al., 2006) includes 10-Session COPE Workshop for Parents of 4- to 12-Year-Olds with ADHD.

1. Information Night and Introduction to ADHD
2. Attending, Balanced Attending, and Rewards among Siblings
3. Planned Ignoring
4. Token Incentive Systems 1
5. Transitional Warnings and “When–Then”
6. Planning Ahead
7. Token Incentive Systems 2 (Response Cost)
8. Time out from Positive Reinforcement 1

## 9. Time out from Positive Reinforcement 2

## 10. Closing Session

The **UCLA Children's Social Skills Program** (Frankel & Myatt, 1997) is a combined child and parent training aimed to improve social skill abilities of children but also to enhance parent's compliance during homework tasks the use of positive discipline, price and incentives. The Parent training is described in this session while the social skills training of children is described in the social context section. The sessions are organized as follows:

- Encouragement and discouragement of children's social behavior
- Parent support of social skills
- Group entry and rejection
- The elements of effective praise
- How to have a successful play date
- How children "make fun of teasing"
- Confrontation with adults
- How to decrease physical fighting

The **Mindfulness Training program** (van der Oord et al., 2012). Recent studies investigate the effect of mindfulness training program on parent-child interaction and found that this intervention increase the positive interaction (compliant to parent instruction) parenting stress, over-reactivity, permissiveness and mindful awareness rated by parents open new frontiers for novel treatment procedures using this approach.

### 3.2. Specific Parent Training program in UK (ADDISS)

---

In the UK there are 4 main parenting programmes available for the treatment of ADHD: Incredible Years (IY), 1-2-3 Magic, Positive Parenting Programme (Triple P) and the New Forest Parenting Programme (NFPP).

The **Incredible Years Programme** (IY) (Webster-Stratton, 1996) programme is a therapist led parenting intervention that aims to reduce child disruptive behaviour by establishing a positive relationship between parent and child by teaching parents interactive play skills and encouraging praise and reward for positive behaviour. Parents are also taught strategies to deal with child misbehaviour and non-compliance.

More in depth, the **IY** is a series of programs focused on reinforcement parenting skills (monitoring, positive discipline, confidence) and encourage parents' involvement in children's school experiences in order to promote children's academic, social and emotional competencies and reduce conduct problems. The programs are addressed to different age groups. It includes role-play, movies modeling, and collaborative group-based discussions method appears to be a promising program for families of children with ADHD.

*Preschool/Early Childhood program (3-6 ages)* includes the following contents:

- Strengthening Children's Social Skills, Emotional Regulation and School Readiness Skills
- Using Praise and Incentives to Encourage Cooperative Behavior
- Positive Discipline - Rules, Routines and Effective Limit Setting
- Positive Discipline - Handling Misbehavior
- School Age programs (4-12 ages)
- Effective communication between adults and children
- Problem solving skills for children and parents
- Promoting Positive and Reducing Inappropriate Behaviors in School Age Children

In a large culturally diverse sample of children aged approximately 4 years old, receipt of IY parenting programme is associated with reduced observed problem behaviour in children and higher levels of positive affect and praise from mothers compared to controls (Reid et al, 2001). In addition, in a sample of preschool children at risk of developing conduct disorder and ADHD receipt of the IY intervention is associated with

improved parent reported ADHD symptoms after controlling for improvements in disruptive behaviour (Jones et al., 2007).

There is little research however examining the effects of the IY programme for children with a primary diagnosis of ADHD. Webster-Stratton (2011) has investigated the effects of the combined parent and child components of the IY programme with parents of children aged between 4-6 with ADHD. Children received the IY dinosaur school training programme, which has components aimed at improving child social and academic competencies and appropriate behaviour in the classroom. Receipt of the combined intervention associated with reductions in parent-report and observed levels of hyperactive, aggressive and defiant child behaviour. Mothers also reported reductions in the use of harsh discipline strategies and were observed to use more praise and be less critical during interactions with their child. Online resource.<http://www.incredibleyears.com/program/index.asp>

The **1-2-3 Magic** (Phelan, 2010) is a parenting programme in the form of book and videos and aims to provide simple strategies such as time out and rewards in order to improve the parent-child relationship and reduce oppositional behaviour. The 1-2-3 Magic video has been empirically evaluated in one study where the 1-2-3 magic video was delivered in a group format to parents of 3-4 year old children who reported experiencing difficulties with their child's behaviour. Facilitators then encouraged group discussion about problem solving. Parents reported improved parenting behaviours including less over-reactive and lax parenting and reductions in parent-reported hyperactive behaviour although the effect size is very small possibly because the study didn't use a clinical sample (Bradley et al, 2003).

This is the most successful program that ADDISS uses. Its simple to understand and parents can apply this approach and perhaps more importantly maintain it effectively after a very short exposure to training. The fact that parents of ADHD children can use this is important as many parents of ADHD children are ADHD themselves and this program provides a structure that they can hold onto and manage to use it effectively.

The **New Forest Parenting Programme** (NFPP) (Sonuga-Barke, Thompson, Daley, & Laver-Bradbury, 2004) is a parenting programme that has been specifically developed for the management of ADHD in preschoolers. In addition to behavioural strategies aimed at helping parents to manage difficult child behaviours, the intervention also includes ideas for games and activities aimed at targeting some of the self-regulatory deficits that are commonplace in ADHD. Ideas include card games such as '*snap*' and '*matching pairs*', which may help the child's working memory and practice their ability to take turns. Supporting the child's development through parental scaffolding is also a key component of the NFPP.

In an empirical evaluation of the NFPP, Sonuga-Barke and colleagues (2001) found that the receipt of the NFPP was associated with reduced parent reported ADHD symptoms and observed ADHD symptoms during a task compared to a waiting list and parent-support and counselling control group that did not provide parents with strategies for behaviour management. In addition, Thompson and colleagues (Thompson et al., 2009) reported that NFPP improved parent-reported ADHD symptoms in a sample of pre-school children with ADHD. A self-help version of the NFPP is also available, which comes in the form of a six-step selfhelp manual. Receipt of the self-help version of the NFPP has also been shown to reduce parent reported ADHD symptoms and improve parenting efficacy in parents of school-aged children with ADHD (Daley & O'Brien, 2013).

The program's steps and details are available at

<http://education.gov.uk/commissioningtoolkit/Content/PDF/New Forest Parenting NFPP.pdf>

The **Positive Parenting Programme** (Triple P) (Sanders, 2000) teaches parents 17 core parenting strategies aimed at promoting a positive relationship between parent and child and strategies such as effective limit setting and discipline techniques to help parents manage misbehaviour. The standard version of the Triple P programme can take place in groups or individually; there is also a self-directed version.

Bor and colleagues (Bor et al., 2002) found that both the standard and enhanced versions of the Triple P programme improved parent reported problem behaviour in this sample. Receipt of the intervention was also associated with less dysfunctional parenting practices as reported by parents.

An enhanced version of the Triple P parenting programme specific for ADHD has also been shown to improve parent report of child disruptive behaviour and parental confidence in their ability to handle child misbehaviour in a sample of children with clinical diagnosis of ADHD aged between 5 and 9 (Hoath & Sanders, 2002).

### 3.3. Specific Parent Training program in Italy (Ce.D.Ap)

---

The Vio and Marzocchi parent training program (Vio et al., 1999). The need to help families with ADHD children came out of the research studies that led the authors to outline a program adapted to implement strategies for managing the behavior of their children. It is divided into 9 modules and aims to help parents to correctly interpret the behavior of the child to enhance the constructive aspects of the report, to structure a predictable environment that encourages self-regulation and reflection, teach parents some educational techniques in order to implement their range of strategies.

The first part of the model identifies a psychoeducational approach, which aims to inform parents about the characteristics of the disorder and ADHD child from the literature; the second part, however, provides training for parents. This training teaches parents to define the behavior problem and seeks solutions that promote behavior change.

The program structure includes the following sessions:

1. Understanding the problem (information on training, on ADHD, parents fill out "Questionnaires sense of efficacy and satisfaction")
2. Preparation of parent to change (debate on attitudes, beliefs and parenting behaviors)
3. The complexity of the problem (discussing the interaction between the characteristics of the child, the educational choices and situations)
4. The self regulation education choices (predictable environment, routine, the use of rewards, special time)
5. Identify the unwanted behavior of child (specificity are identified, priority, differentiation between slightly negative behaviors and severely negative)
6. Expand the toolbox of strategies (explains the cost of the response, partial goals)
7. Act advance and plan ahead (the analysis of the antecedents and consequences in problem situations)
8. Parent as an able problem solver (the parent becomes a model of problem solving, applying use in real-life situations)
9. Make a final report of the work

The most effective assessment tools in this program are:

- the questionnaire of the sense of self-efficacy - version for both mothers and fathers - adapted from Parenting Sense of Competence Scale (PSOC) of Johnston and Mash (1989). It is a scale consisting of 16 items, 9 of which relate to the construct satisfaction and effectiveness 7. These constructs are measured on a 6-point Likert scale ranging from "strongly agree: 1" to "strongly disagree: 6".
- The SDAI and SDAG scales (described in the Assessment Tools section).

Rinaldi and Chifari (2011) have reviewed this traditional model with the aim to build a new advanced model that would meet the following requirement:

- need to promote problem solving skills in parents and to make them more independent
- allows parents to generalize and apply what they had learned during the previous PT in specific situations, Vio and Marzocchi (ibidem)
- allow parents to learn the correct way to do functional analysis and put into practice the main behavioral management strategies or plans for solving specific problems at home

The new model is divided in 10 group sessions of one hour and a half every 2 weeks with follow-up meetings at 1, 3, 6 months. At each session a family is chosen as the main subject, members have to talk about the main

problems that affect them at home. The group participates as a resource, giving feedback and providing alternative points of view, alternative strategies of behavior or experience, etc. The focus is on problem solving techniques. The common denominator of the different session is the use of the monitoring techniques (a diary), of problem solving and constructive conflict management. At the end of each session homework is assigned to parents. Brief description of the meetings:

- 1st meeting: psychoeducational phase. Screening of the video AIFA (Associazione Italiana Famiglie ADHD) "When airplanes are orange"; knowledge of the group and explanation for the compilation of the PSI and the Questionnaire of self-efficacy (annex 1).

*Homework*: filling out the questionnaire

- 2<sup>nd</sup> meeting: every family identifies 2 problem behaviors and describes the behavior on the schedule provided. Each pair of parents together make an agreement at home with the intention of creating strategies and solutions for the identified problems (scheduled meeting).

*Homework* : filling out forms with the identified strategies and testing them; compilation of the diary to record the frequency of the 2 target behaviors chosen.

- 3rd meeting: the stages of problem solving and application of a problem chosen by a family. Discussed the first aspect of the PS, which are the identification and definition of the problem and reflect on ways to solve it.

The steps of PS are:

1. Identification and definition of the problem
2. Reflection on ways to solve a problem
3. Choosing the best possible solution
4. Check the best possible solution

After identifying the problem behavior chosen by a family, it is proposed that an initial brainstorming. All the resource group participates and works to identify all the possible strategies that they think they can put into practice to solve that problem.

*Homework*: filling out a form (analysis of the problem) for a behavior identified by each family and application of PS on one of the 2 problem behaviors chosen.

- 4th meeting: monitoring of the work at home (strengths and weaknesses) - last step of the PS - Every family explains what happened
- Analyzing what did not work and seek possible explanations - Apply the functional analysis (ABC).

*Homework*: Each family identifies strategies to improve and experiment, and any corrections to be made in the schedule.

- 5th meeting: module of Functional Analysis and Role Play.

*Homework*: parents fill in the tabs of the functional analysis according to the ABC model for the 2<sup>nd</sup> behavior problem identified by family

- 6th meeting: module on assertiveness
- Phase psychoeducational to recognize aggressive behavior both passive and assertive - Role-playing game to recognize the behavioral style
- Rules to make an assertive request to their child or partner
- Trainers teach assertive techniques (e.g., broken record technique, etc.).

*Homework*: Each family must monitor on a daily diary and identify their assertive behavior. Parents will practice using assertive requests home and record the consequences "What has changed the behavior of your child? And your behaviour? Did you feel better?"

- 7th meeting: educational strategies for mild and severely negative behaviors

*Homework*: each family identifies appropriate strategies to be tested on the 2 problem behaviors, carefully noting what happens in the schedule.

- 8th meeting: monitoring of 2 problem behaviors and discussion on two case studies and strategies applied.

*Homework*: filling in the diary for self- monitoring



- 9<sup>th</sup> meeting: monitoring through role-play on the management of two problem behaviors that have been identified by two families.

*Homework*: filling in the diary for the 'self-monitoring.

- 10<sup>th</sup> meeting: report of work performed; viewing and discussion of the daily diaries; compilation of Questionnaires (Retest)

Subsequent meetings of follow-up ( 1, 3 , 6 months).

The most effective assessment tools in this PT advanced are:

- the Parental self-efficacy questionnaire which is administered during opening and closing of the PT.
- the Parenting Stress Index (PSI).

### 3.4. Specific Parent Training program in Portugal (UAEI)

In Portugal, there is more literature recognizing and emphasizing the importance of parental training programs on intervention planning (e.g., Coutinho, 2004; Marujo, 2002). However, there are few studies documenting or piloting these programs on parents of children with ADHD.

Malaca (2008) proposed the development of a training program for parents whose children were diagnosed with ADHD based on the interviews conducted with 5 parents. The guidelines for this training program were to: (1) promote a relationship based on supportive and reciprocal affect, without blaming feelings; (2) invest in active methodologies; (3) develop solutions in cooperation; (4) look at ADHD for a non-problematic vision of it; (5) promote the value and identification of parental resources; (6) promote discussion and strategies training. This program training was framed by Solution focused brief Therapy (SFBT) principles – highlighting parents' already existing capacities and sources, and giving them an active role on their child intervention through a cooperative determination of solutions between parents and technicians.

The implemented training program - "*Parenting oriented towards solutions: a new way of understanding and coping with ADHD*" - was consisted of six sessions.

1<sup>st</sup> session: Participants' introduction, by choosing one word-card, representing a coping capacity with their child behaviour or an activity that they like to do. At the end of the session parents were asked to rate their child's behaviour in the last week from 1 to 10 (which 1 represents the worse and 10 the best moment of your child behaviour). The answer to this question will allow the monitoring of the child's behaviour as it changes during the training program. Home assignment: observe the considered which are the best moments of their child daily behaviour, thinking of how their skills, resources, talents as parents and how child's characteristics influenced that moments.

2<sup>nd</sup> session: identification and establishment of goals that can enhance the parents' strategies on child's behaviour management.

3<sup>rd</sup> and 4<sup>th</sup> session: description of strategies used by parents, and discussion on their understanding of the results, reinforcing the maintenance of the strategies that works with the child and creating a change of the ones that do not work. Solution-focused questions and role-play activities were used for parents to choose and implement the solution that better fits their child.

5<sup>th</sup> session: parents' were asked to classify their own progress along the program as well as the child's behaviour during the last week. Questions such as "What do you have to do/ or not to do in order to come back to the initial situation?" "What do you think that you can do more of or in a different way to improve the results?"

6<sup>th</sup> session: to move from a problems/difficulties-focused context towards a solutions-centred context was celebrated. Their children shared their own opinions on the solutions and resources that worked better for them – providing feedback on parents' behaviours.

Azevedo (2011) presented an intervention program to individuals with ADHD, composed of twenty sessions – where two are dedicated to the parental education and two to parental behaviour training. On parents education sessions provides information about the ADHD, with the aim of informing parents about the disorder, providing materials for parents better understand the disorder and offering discussion opportunities

about intervention programs. The parental training covers the identification of the individuals' problems that interfere with family dynamics and the use of brainstorming techniques to support the problem-solving process. Although studies that specifically focus on the training of parents, of children with ADHD, are almost absent in Portuguese literature, there are some Parent Training Programs that cover this area. Abreu-Lima. (AbreuLima et al., 2010) reviewed 28 interventions that they divided into 4 groups:

- International standardized interventions: in general, programs that have been translated and adapted to the Portuguese culture and population and that follow a clearly defined set of contents, procedures and instruments (e.g. "Incredible Years", "Family Strengths", "Building Families")
- National standardized interventions: programs built and designed in Portugal, eventually based on loose adaptations of other programs. These programs are not evidence-based because they did not have controlled field trials. Nevertheless they allow replication because they include a clear set of procedures and contents (e.g. "More Family", "In search of family treasures", "Mission C")
- Structured interventions: these include tailored programs, based on the identification of the needs of the families, including, with some detail, contents, procedures and materials that allow their relative replication (e.g. "Weaver", "Trampoline")
- Flexible interventions: correspond to interventions with limited previous structure, developed according to the specific needs of the target group. Some of these continue to be developed during the training process (e.g. "Mother School", "Parentalities"). Due to the lack of previous structure or of written support, it will be difficult to replicate any of these procedures.

The results gathered show that in general interventions helped participants to: -

get more awareness of their educational practices

- understand the need to change some of their behaviours and practices
- see themselves as more empathic to the needs and feelings of the children
- minimize physical punishment as an effective educational strategy
- see themselves as more respectful of the identity of the child
- gain a greater sense of competence, diminishing the stress associated with parenting roles - feel less depressed, socially less isolated and more supported by their informal network - identify a reduction in the number and intensity of the behaviour problems.

### 3.5. Specific Parent Training programs in Ireland (TCD)

---

The **Parents Plus (PP) Programs** (Sharry & Fitzpatrick, 2008; Sharry & Fitzpatrick, 2009; Sharry, Hampson & Fanning, 2009). The PP Programs are practical and positive video based parenting courses designed to support and empower parents to manage and solve discipline problems and to create satisfying family relationships. There are currently 3 versions of the program;

1. The Early Years Program for parents of children aged 1 – 6 years
2. The Children's Program for parents of children aged 5 – 10 years
3. The Adolescents Program for parents of children aged 11 – 16 years

The focus of the PP program is positive, aimed at positively building parents' strengths and to help them to solve discipline problems themselves. Each program includes 8 – 12 sessions of 2 hours with up to 12 parents in each group. In addition, specific groups for parents of children with ADHD are available. The PP programs focus on the interaction between parent and child. Behavioral change is encouraged by supporting parents to respond differently towards their children. An example of this would be by removing attention for negative behaviour and directing attention towards positive behaviour choices through specific praise. When the gain for misbehavior is reduced and the reward for positive behaviour increased, negative patterns can be stopped and positive ones emerge. There are currently 12 published studies providing evidence for the effectiveness of the Parents Plus Programmes in reducing behavioural problems and parental stress in a variety of contexts and with a variety of age groups (e.g. Coughlin, Sharry, Fitzpatrick, Guerin, & Drumm, 2009; Griffin, Guerin, Sharry, & Drumm, 2010; Hand, Mc Donnell, Honari, & Sharry, 2013).

# PEERS CONTEXT

---

EDITED BY ALL PARTNERS COUNTRIES

## 1.ASSESSMENT

---

The aim of this section is to review theoretical issues about the ADHD behaviors in the social context, to identify behavioral/functional clusters and to collect tools (i.e. observation charts, rating scales, questionnaires, etc.).

### *1. Relevant studies about the ADHD behavior during social activities, including peers behaviour and the interaction between peers and ADHD subjects.*

---

Children with ADHD commonly have poor peers relationship. In most cases peers reject ADHD students and few are “popular” with their peers (Pelham et al., 1982; Hoza et al., 2005). There are many risks associated with peer rejection such as substance abuse, school dropout, delinquency, academic problems, and psychopathology (Bagwell et al, 2011).

This social deficit is directly related to ADHD symptoms. According to Bierman (2004) there is a particular relation between peer rejection and inattention, immaturity, hyperactivity, impulsivity, poor emotion regulation, and aggression of ADHD subject. According to McQuade and Hoza (2008) inattentive symptoms contribute to greater difficulty attending and actively participating in social interactions, whereas in contrast hyperactivity/impulsivity symptoms contribute to more aggressive and overtly negative social behavior. The social difficulties of ADHD subjects can only be only one aspect of a set of more wide-ranging cognitive deficits. For instance, Hoza (2007) suggests that children with ADHD have extremely poor selfperceptions of competency of their own social behavior. As a consequence, they evaluate themselves as doing better in an interaction than an objective performance rating made by external observers. This phenomenon is called “positive illusory bias”.

However, social behaviours displayed by children with ADHD may vary according to their ADHD subtype. Whilst, children with the ADHD combined type have been found to be more aggressive and intrusive during social interactions in a computer chat room setting, primarily inattentive children were more likely to appear withdrawn in the conversation and have poorer memory of the conversation (Mikami et al., 2007). Another work of Mikami (2010a) underlines the importance of friendship for young people with ADHD. This is different from peer acceptance. Friendship is seen as a close relationship between two children that is mutual and reciprocal.

Unfortunately, people with ADHD are less likely to have friendships than non-ADHD subjects. For instance, Gresham (Gresham et al., 1998), using the sociometric methodology, found that the most children with ADHD and conduct problem comorbidities do not have reciprocal friends in their classrooms. This contrasts with almost half of the children with other symptoms but not ADHD and small percentage of control group of children who do experience reciprocal friendships. Popular children tend not select children as friends who have ADHD. For this reason ADHD subjects are less likely to be involved in conventional activities and more likely to use illegal substances (Marshall, 2003). Teachers’ reports of social competence using the social skills rating system have also highlighted differences in social competence between subtypes. Teachers also reported that children with ADHD had worse social competence overall. Children with primarily inattentive ADHD were reported to have more problems with assertion, whereas children with combined type ADHD had more problems with self-control (Solanto et al., 2009). Similarly, Blachman and Hinshaw (2002) found that in a sample of 228 girls taking part in a summer camp, girls with ADHD combined type were more likely to have difficulty establishing friendships, whereas girls with primarily inattentive ADHD have difficulty maintaining friendships once they have been established. As a result of deficient social competence, children with ADHD

are less likely to be selected as friends by classmates and more likely to be socially rejected (Hoza et al., 2005). In fact, a further problem is the negative reputation that ADHD students developed within the social group. They are often labeled negatively and this could also be a failure factor in children supported with intensive interventions.

The degree of social impairment seems to be not related to gender. Both boys and girls showed similar level of social impairment (Greene et al., 2001). However, ADHD girls seems to be more likely to have higher verbal aggression rates than girls without ADHD (Abikoff et al., 2002; Zalecki & Hinshaw, 2004) while boys exhibit higher rates of interrupting, aggression and rule breaking behavior than girls (McQuade, *ibidem*).

However, it is not just the behavioural manifestations of ADHD that may impact on social competence. A study comparing boys “at risk” for ADHD with matched boys developing typically normal controls found that impaired recognition of facial affect (as assessed by a computerised task with happy, sad, scared and angry facial stimuli) was associated with lower teacher reported social skills for boys in the at-risk group only (Kats-Gold et al., 2007).

Besides, other studies highlight that children with ADHD often appear to be more socially intrusive compared to their non-ADHD peers, (Frankel & Feinberg, 2002). Pelham and Bender (1982) found that a child with ADHD spends more time initiating conversation and asking questions compared to their nonADHD counterparts during free play and arts and crafts activities. Children with ADHD also engaged in more aggressive acts during the interaction including loud shouting and hitting. During observations in a summer camp it was found that aggression from children with ADHD was a key predictor of more negative nominations from peers (Hinshaw & Melnick, 1995).

Some representative assessment tools to assess social skills are described in the chapter Assessment (par. 2.1).

## 2. INTERVENTION

---

The aim of this section is to review strategies to face problematic behaviors of intervention in the social context (i.e. difficulty to interact with peers, to regulate motor behavior, to regulate emotions, etc.).

### *2.1. Relevant studies about intervention strategies to manage problematic behaviors in social contexts (ADDISS, UAEI).*

---

It is possible that parents of children with ADHD engage in behaviours that may directly impact on their child’s social functioning. In a comparative study, Mikami and colleagues (Mikami et al., 2010b) found that parents of children with ADHD host fewer play dates for their children and are more critical with their children after social interactions compared to parents of typically developing children. In light of such evidence authors have developed a Parental Friendship Coaching Intervention (PFC), which encourages parents to provide feedback on their child’s social skills and help to create additional social opportunities for them (initiate more play dates). The intervention has been assessed in families of 62 children with ADHD and delivery of the intervention was associated with reductions in the amount of reported parent conflict and levels of disengagement that children displayed during peer interactions. Teachers also reported increases in the amount of children in the class that liked and accept the child and decreases in the number of children that rejected the child.

Whilst medication may reduce negative social behaviours displayed by children with ADHD it may not increase levels of prosocial behaviour (Hupp & Reitman, 1999). One study has introduced a token economy programme into a sports setting where children with ADD received tokens each time they demonstrated ‘sportsmanlike’ (cheering, praising teammates) and attentive behaviour. This study found that rates of sportsmanlike behaviour were maintained once reinforcement contingencies were faded (O’Callaghan et al, 2003).

An alternative approach is use of ‘buddy-up’ intervention where children are paired with another child on the basis of interests, behavioural, academic competence and were encouraged to take part in activities together

like class projects and spending lunchtime together. In one study this approach was used as part of a summer treatment programme and therefore was unable to separate the effects of the buddy-up component of the intervention from other components involved in the summer treatment programme. However, the intervention was based on evidence that having one dyadic friend can protect against the negative effects of peer-rejection (Erdley et al., 2001).

Enright and Fitzgibbons (2000) suggested that clinicians might reduce anger in individuals with ADHD by introducing them to forgiveness interventions to help manage failed social interactions. Similarly, Weyandt and DuPaul (2006) stated that the introduction of forgiveness interventions to a population of college student with an ADHD diagnosis could offer a nonmedical intervention. This can be observed by the mental health, medical, educational, and social communities and will hopefully prove to be worthwhile in relieving anger in these college students and hopefully improve their overall academic performance.

However, generally for college students with a diagnosis of ADHD the combined treatment plan: academic accommodations plus pharmaceutical agents seems to demonstrate an effective result for most students with an ADHD diagnosis.

## *2.2. A description of good intervention practices in context with attention to both methodologies and tools.*

---

Because of their characteristics of impulsivity, inattention, and dominating character, children with ADHD often fail to consider the needs of others. The prevailing aggressive style and the propensity to oppose the rules, ensures that these children are often dismissed. The ADHD children enter into a negative relationship with each other, and indeed may often seem outwardly sociable and outgoing. However they often fail in cooperative play, have difficulty to comply with the shifts, are competitive and appear reluctant to accept defeat. The lack of empathic ability puts them in an unenviable position where they misinterpret the emotional states of others and do not to decode the social messages correctly and they tend to attack rather than be attacked. It is helpful to include approaches aimed specifically at the cognitive level of awareness and transformation that prevents assertiveness than to a devaluation of the negative thoughts towards their self and others. From an emotional point of view is useful to introduce activities exploring role playing exploring how others feel as a result of them experiencing dysfunctional behavior.

In clinical work it is necessary to recognize the skills or abilities the child or young boy holds up through an inventory to be implemented or incorporated in his repertoire, or help develop their assertiveness. It seems particularly useful to use techniques such as role play, puppets, videos or similar tools to re-experience situations that they have already felt or imagined and begin to recognise the passive, assertive and authoritative styles of behaving that they have used.

You can start from the recognition of your own emotions and those of others to help to learn how to say 'no' to a request, or defuse the anger, express or receive praise and learn negotiating etc. Of course you have to take into account that a major difficulty of ADHD children is the ability to transfer the skills acquired in one setting of interpersonal relationships (generalization). From a therapeutic point of view it is important to experience the training outside of a context of study, or in an ordinary context that is known to the child in order to promote autonomy,

In the classroom, the teacher can encourage the integration of the ADHD child while tutoring small groups or in cooperative learning where the child has an active social part and this can begin to scratch off the negative label that has been given to them.

With regarding to the tools we use to build **Sociometric Ratings**, as described above, in order to assess the popularity of a child with their classmates or peers. Generally children are given a list of children in the class and asked to name the children in the class whom they would most like to play with and children in the class who they would least like to play with. The child with ADHD may also be asked to complete an additional rating to assess whether the children, they select as friends, reciprocate the friendship that will provide an indication of dyadic friendships. Sociometric studies are often seen as the 'gold standard' for assessing child peer functioning and may therefore be the best measure of a social intervention outcome.

### 3. SUPPORT

---

The aim of this section is to review the most relevant social skills training programs to help ADHD subjects to interact appropriately with others and make friends.

#### 3.1. *The international overview of relevant social skills training programs (ITD-CNR)*

---

There have been many social training designed to improve children's appropriate social behaviors and to encourage them to develop more successful peer relationships.

Generally, social skills' training is group-based and involves children of the same age group. A parent training is often held at the same time of the children group.

Commonly, the aims of social training are to improve the skills of self-managing negative emotions, increase problem-solving abilities, and improve the capacity to organize and to participate and manage play dates through verbal and non-verbal communication.

In general, coaching, role-playing and modeling cognitive-behavioral strategies are the usual methods applied by trainers. In order to encourage the generalization of the learned skills and to control potential disruptive behavior a token economy is introduced so as to reward positive behaviors at home and in class when children gain a preset number of token during the training.

Social skills trainings generally last 8-12 sessions. The duration of each meeting is normally between 50 and 90 minutes and the frequency is variable.

Unfortunately, the social deficit related to ADHD is one of the most problematic areas of the disease. In a recent meta-analysis, Storebo and colleagues (Storebo et al., 2012) evaluate the effect of the social treatments on both the childrens competence in social skills and the ADHD symptoms finding no statistically significant effects. Similarly, Abikoff (Abikoff et al., 2004) underlines the lack of improvement in peerrejection rates. Interestingly the long-term effects of training have not been deeply examined yet.

The **Social skills training** by Antshel and Remer (Antshel & Remer,2010) has been tested with children ages 8-12 with ADHD. The training is composed of 8 meetings focused on the following six modules:

1. cooperation with peers
2. problem solving
3. recognizing and controlling anger
4. assertiveness
5. conversations
6. accepting consequences

Each training session is structured in the same way:

1. review of the child report about the use of a target social skill in the previous week
2. introduction of the new social skill to be learned (one per week)
3. modeling of the new social skill
4. role-playing to experiment the new skill. At the end of this phase children rate each other's performance
5. 15 minutes free period in which children are asked to use social positive skills with someone else

During the training, children earn points for attention, respecting rules or doing homework. These points can be used to access games or special activities during the last 15 minutes of the training.

The training also includes 3 meetings with parents:

1. at the beginning of the training, parents are informed about the training structure and methodologies, as well as the way to monitor their child behavior at home
2. during the fourth meeting, trainers assess progresses with parents

3. during the last meeting, trainers give parents a summary of the results

The **Social skills training** by Abikoff (Abikoff et al., 2004) assigns children to groups of four. The program addresses five main functions:

1. Basic interaction skills
2. Getting along with others
3. Contact with adults at home and at school
4. Conversational skills
5. Problem situations

Trainers use modeling, role-playing and evaluation of the previous meetings video-recording in order to identify appropriate and inappropriate behaviors. Trainers apply the following strategies to facilitate generalization:

1. homework assignments
2. teaching parents to foster and praise targeted social behaviors
3. praising children during academic improvements for targeted social skills
4. including social behaviors on the daily school report card

Trainers use a rating system to evaluate the child both on general behavior and program skills every 20 minutes of each meeting. Ratings (+3 to -3) carried an equivalent number of points. At the end of each 60 minutes session, children have to be informed about the total of the points gathered. Starting from the seventh session, consequences were delivered at home.

The **Child skills training** by Pfiffner (Pfiffner & McBurnett, 1997; Pfiffner et al., 2007) is intended to improve skills for both the independence of the child and social skills. This training can be applied both to children with general ADHD and with ADHD-I.

The methods applied during the instruction are: didactic instruction, behavior rehearsal, in vivo practice in the context of a reward-based contingency management program, cognitive-behavioral strategies and roleplaying. The independence skills modules include:

- homework/study skills
- self-care skills
- getting chores done independently
- planning
- time management

Six social skills modules are included in the training:

- good sportsmanship: participating and staying with the game, following rules, sharing
- accepting consequences: accept negative circumstances and deal with frustration
- assertiveness: distinguish among passive, aggressive, and assertive form of communication
- ignoring provocation
- problem- solving skills
- recognize and deal with feeling
- making friendship and managing play dates (specific for ADHD-I) Each training session is structured as follows:
  - Review of the positive skills applied at home by children during the previous week □ Introduction of the skill of the week focusing on why, how, and when use it
  - Skill modeling
  - Children role-playing based on brief scripts followed by an evaluation of each other's performance □ 30-min indoor game asking to apply the learned skills

Each week, children exchange earned stars from their home and school challenges for rewards.

At the same time of the children group, parents are involved in a group for them. The two groups are merged during the last 15 minutes of activities.

The child skills training lasts from 8 to 12 weeks.

The **Behavioral and social skills** (Tutty et al., 2003) is aimed at children with ADHD aged 5-12 years. The training program is intended to improve the management of both physical and psychosocial problems associated with ADHD.

The intervention is composed of 8, 50-minute group sessions. Children and parents are assigned to 2 different groups. Children groups are arranged by age.

Each training session is focused on a specific aim:

- Session 1: Listening skills
- Session 2: Expression of Feelings
- Session 3: Anger management
- Session 4: Anger management
- Session 5: Self-control
- Session 6: Conflict resolution
- Session 7: Friendship skills
- Session 8: Self-esteem

Every session is structured in the following way:

- introduction to review program objectives, group rules, and session agenda (5-minute)
- educational presentation of the session content, using written educational materials, role-playing, video presentations or other creative stimulus (25-minute)
- discussion with group participants (15-minute)
- review of take-home points (5-minute)

The **UCLA Children's Social Skills Program** (Frankel & Myatt, 1997) consists of 12 x 1 hour per week sessions. It mainly focused on previously identified social skills deficits.

Each session is structured in following phases:

1. Report of the homework assigned to children (10 minutes)
2. Didactic presentation, behavioral rehearsal between children and coaching (15 minutes). For instance: conversational techniques; how to play detective to share information; how to make friends; how to play with other children; how to be a good host; how to face teasing, how to handle confrontation with adults.
3. Coached play (25 minutes): the children have to dispense token, verbal reinforcement, relevant comments to a playing dyad
4. Re-union with parental group and homework assignment (10 minutes). Homework is assigned as follows 1) telephone another class member and share information  
2) bring a non-violent toy from home  
3) join a group of playing children  
4) held a playdate  
5) make fun of teasing

The training includes parent sessions that are carried out at the same time of children training.

The **ClassWide Peer Tutoring** (CWPT) (Greenwood, 1997) is a peer tutoring instructional strategy aimed to improve student's social competences and promote a good learning climate between peers.

CWPT can be summarized in the following steps:

1. The review, activation of prior knowledge, and introduction of new material to be learned
2. Preparation of weekly units/content materials to be tutored
3. New partners each week
4. Partner pairing strategies
5. Reciprocal roles in each session
6. Teams competing for the highest team point total



7. Contingent point earning
8. Tutors providing immediate error correction
9. Public posting of individual and team scores
10. Social reward for the winning team

A number of studies have applied CWPT in classrooms including students with ADHD. Evidence suggest that students participating in CWPT are actively and positively engaged with their peers while carrying out the CWPT program in an academic setting and in some cases increasing their on-task behavior (DuPaul & Henningson, 1993; DuPaul et al., 1998; Plumer& Stoner; 2005).

### *3.2. The Italian overview (Ce.D.Ap.)*

---

The poor quality of interpersonal relationships forces the teacher to develop action plans on the development and improvement of social skills for children with ADHD in the classroom. A useful intervention program on the development of basic skills has been devised by Di Pietro (Di Pietro et al., 2001). The program includes the teaching of the following skills:

- a) self-instruction
- b) to recognize the non-verbal aspects of communication
- c) to recognize emotions
- d) how to join a group
- e) how to do and how to refuse a request

For each activity homework is assigned. The first skill requires the child to learn 4 key steps. The teacher discusses real life examples and models the way forward by asking the following questions: "what is the problem? ", "What can I do?", "Try out the solution?", "How did it go?".

For the second ability you use modeling identified by the teacher. The aim is to recognize non-verbal aspects of communication on certain situations using proposals of school life from the boys and providing them with feedback of self-regulation.

For the third skill we show images that represent emotions, paying attention to the communication channels (smiling, eyebrows, shoulders, posture, etc.) and dramatize situations that recall the main emotions and identify distortions.

For the fourth skill teachers demonstrate appropriate and inappropriate ways to join into a group. You simulate situations in which the child should try to join the first group how it would normally do it, then using the suggested method from the teacher.

In the last skill they will talk about the expectations and obligations when you're in a group. Examples of situation are listed on a Board such as when you want to ask a favor of someone or you must refuse a request. The program consists of assessing and verifying what has been learned.

To control emotions and anger Lochman (Lochman et al., 2008) introduce Coping Power, a structured program delivered in 32 meetings lasting one hour each addressed specifically to those children who have a comorbidities with oppositional defiant disorder or conduct disorder. It is based on cognitive-behavioral techniques and the activities are aimed at strengthening of some of the abilities (e.g. arrange to study effectively, manage anger, understand the other persons point of view, resist provocations, undertake long term goals and medium and short term). Trying to feel an emotion in the chosen activity and learning to handle it just as is happening. Hopefully leading to increase the probability and possibility of generalizing the positive experiences. At the same time working with parents to help them to understand how to manage their emotions and their children during interactions.

Another program to control aggressiveness and self-regulation has been developed by Di Pietro (2001). It teaches techniques such as relaxation, the use of images or counting backwards to calm down. It also teaches the use of ABC and explores a behavioral understanding of what it is that triggers the problem. Then using assertive techniques to avoid triggering the conflict and developing the ability to implement social and interpersonal problem solving while maintaining a conflict logbook.

Kirby and Grimley (1989) also propose cognitive-behavioral intervention to challenging interpersonal problems ranging from teaching how to contain the knee-jerk responses while producing alternative solutions and developing ways to recognize and manage your emotions.

### *3.3. The UK overview (ADDISS)*

---

In social skills training, children are instructed about suitable behaviours that may lead to improved relationships with peers. The literature provides mixed results as to whether social skills training is an effective treatment option for improving social competencies in children with ADHD. Pfiffner & McBurnett (1997) found that social skills training and parent training improved parent-reported social skills.

In the SOSTRA trial, social skills training took place during 8x90 minute therapist led sessions aimed at teaching children how to read subtle cues during social interactions and respond with appropriate verbal or non-verbal behaviour. Sessions covered different topics including impulse control and aggression management (Storebo et al., 2012). Children aged between 8-12 who met diagnostic criteria for ADHD. In this study of social skills training were used in conjunction with behavioural parent training and compared against the use of treatment with medication alone. The addition of parent training and social skills training to medication did not offer any additional benefit to parent reported social skills compared to treatment with medication alone (ibidem).

Even if social behaviours are improved with social skills training it may not necessarily result in improvements in social relationships, especially with peers who may already have formed negative opinions of a child with ADHD. For example, even though a combination of medication and intensive behavioural therapy (including social skills training) resulted in improvements in teacher reported social skills (The MTA Cooperative Group, 1999), the multimodal intervention was unable to increase the number of children who like and accept the child with ADHD according to sociometric assessments (Hoza et al., 2005).

It may therefore be necessary for interventions aimed at improving peer relationships to be classroom-wide. In a recent study, Mikami et al. (2013) attempted to overcome the possible stigma experienced by children with ADHD by advising teachers to draw attention to the child's positive characteristics and encourage positive interaction between the child with ADHD and their peers. This intervention was associated with fewer negative nominations from peers and more positive written messages from peers compared with an intervention that focuses on improving socially competent behaviour.

### *3.4. The Portuguese overview (UAEI)*

---

Social skill training has been making part of the intervention routes for different target populations and purposes. On a brief overview of Portuguese research on social skills training we can find pilot studies directed to youths at risk (Tomé, 2011), children with Asperger Syndrome (Avila & Simas, 2012), children moving from pre-school to 1<sup>st</sup> grade (Campino, 2012). This emergent literature counts yet there are few experiments aimed at children with ADHD. Representing the efforts on that field, three key studies are summarized.

Azevedo (2011) described an intervention program directed to individuals with ADHD. As part of this broad program – addressing executive functions, attention-training strategies, individual and family education, family communication skills and problem-solving strategies – there was sessions aiming to promote impulsivity-control and individuals' assertiveness, self-instruction, self-control and social skills.

For impulsivity control and assertiveness, this author anchors the intervention on Doyle's (2006) cognitive technique of "Stop, Pull back, Evaluate, Act and Reevaluate". On self-instruction training, there was used Meinchembaum (1969) method, encompassing different steps: "the therapist execute the task, talking aloud about what is doing and specifying what the individuals should do and how"; "the individual executes the task being guide by therapist verbal cues"; "the individual executes the task, talking aloud about what he/she is doing"; "the therapist execute the task, whispering what he is doing"; "the individual execute the task, whispering about what he/she is doing"; " the individual execute the task being guide by his/her own internal language". Self-learning strategies were also taught to the individual: (i) self-questioning ("what should I

do?"); (ii) task analysis (“Carefully”; “Slow”); (iii) self-reinforcement (“I’m doing very well”); (iv) selfcorrection (“not this way. I can do better”). Based on behavioral and cognitive techniques, the training on self-control made use of Joyce-Moniz (1997) strategies: (i) problem-solving tasks (teach to think); (ii) selfinstruction (define the problem, approach the problem, direct the attention and select a response, selfreinforcement and self-correction); (iii) modeling; (iv) contingencies (responses, self-reinforcement and selfassessment costs). Role-playing, relaxation and home assignments were used for social skills training. These sessions were composed of three phases: (1) role-playing; (2) relaxing training; (3) individuals were asked to make a cognitive analysis of different social situations, exploring how to behave in a satisfactory fashion.

Addressing behavior problems of children on 1<sup>st</sup> grade of school, Ventura (2011) implemented a program named REagir (from Ana Rodrigues). Grounded on theoretical and empiric data, this program encompassed a psychomotor intervention and was relational-oriented. As main intervention targets, the program had: the behavioral regulation, and the development of attention and executive functions and social skills. Group dynamics, problem solving, cognitive-behavioral techniques, structured context and thematic sessions were used. The Achenbach System of Empirically Based Assessment (ASEBA), the Teachers’ report Form (TRF) and the Revised Conners Rating Scales were used to report the program results. The obtained data revealed that the students engaged on REagir program showed a decrease on the frequency of negative behaviors.

Martins (2012) developed a social skills training program named “À descoberta”, having as intervention targets the disruptive behaviors, the emotional regulation and the assertiveness. There was a program of 8 sessions: three directed at social skills and five on emotional skills. The activities encompassed times of group discussions, self-reflection, role-playing and brainstorming.

## **PART B**

### **ICT BASED TOOLS FOR ADHD**

---

#### **ICT MONITORING FOR ADHD 1st part**

---

EDITED BY GREEK PARTNER (AUTH)

In the literature there are few computerized monitoring systems, which are based on pre-existing classical forms for the assessment of ADHD. In other words, these programs are used to organize and save the interviews from the parents, the child and the teacher as well as to extract some algebraic indices, which are important for the clinician. This piece of work comes to shed light on the most popular computerized monitoring systems for ADHD, in order to investigate their drawbacks and to suggest some points for future work on WHAAM Application, enhancing the field of assessing and treating ADHD.

## Continuous Performance Test II (CPT-II)

---

The CPT-II **Errore. L'origine riferimento non è stata trovata.** Is a task-oriented computerized assessment of attention disorders and neurological functioning. Its results indicate the possibility that an individual has an attention disorder. The CPT-II can be used to assist parent and teacher rating scales, like Conners 3 and CRS-R (Barkley, 1994)..

The CPT-II can be used with children of 6 years and older and adults. During the attention task a letter appears on the screen and the subject is asked to press the space bar if the letter is not an “X”. The letters appear one, two or four seconds apart, during the 14 minutes of the test’s duration.

CPT-II measures the response time, as well as its variability, the omission and commission error rates and a confidence index which can be used to compare the subject to ADHD and non-ADHD population norms. These norms were standardized using a sample of over 2500 people. Of these participants, 378 were classified as clinical and diagnosed with ADHD, 223 were classified as clinical with some type of neurological impairment, and 1,920 were classified as nonclinical.

Regarding the reliability of the CPT-II, split-half and test-retest reliabilities were examined. The first reliable correlations ranged between 0.73 and 0.9, while the test-retest correlation coefficient was highly satisfactory (Barkley, 1994). When the measures were combined into indices for ADHD and neurological assessment, the consistency across administrations was excellent.

For the validation purposes of the CPT-II, its designers proved that CPT-II scores seem to have statistically significant differences among the general population and the clinical groups (Barkley, 1994). Moreover, hit rates are also provided in order to evaluate the classification accuracy of the test, which is satisfactory in terms of both false negatives and false positives. The results presented in (Mann et al., 1992) also suggest that the CPT II can provide observational and descriptive support in clinical contexts. Despite good discriminative research on the CPT II, it should not be used to make any diagnostic decisions alone.

Finally, it should be mentioned that the software exports a variety of reports including tables, graphs and summarizing assessments of inattention, impulsivity and vigilance.

## IVA+Plus

---

The IVA+Plus is a unique combined auditory and visual continuous performance test, designed to help the clinicians make an accurate diagnosis of ADHD in children, adolescents, and adults. IVA+Plus provides objective indices about a person’s ability to concentrate and to avoid making impulsive errors. This software follows the diagnostic criteria outlined in the DSM-IV, providing various data, in order to make diagnosis and differentiation between the four subtypes of ADHD easier for the clinicians.

IVA + Plus has a main task which lasts thirteen minutes and it presents 500 trials of visual and auditory “1”s and “2”s in a pseudo-random pattern, requiring a set-shift between the visual and auditory modalities. The goal of the test is to click the mouse only when the subjects see or hear a “1” and to inhibit clicking when they see or hear a “2”.

During some segments of the test, the “1”s appear more frequently compared to “2”s, in order to check for commission errors and impulsivity. During the alternate segments, the “1”s occur rarely in order to check the omission errors and inattention, since the subject should remain vigilant waiting for a “1” to occur.

IVA+Plus are divided into four categories; Attention, Response Control, Attribute and Symptomatic. On the other hand, its primary diagnostic scales are the Full Scale Response Control Quotient (FSRCQ) and the Full Scale Attention Quotient (FSAQ).

The FSRCQ is derived from separate auditory and visual response control scores, which are extracted from visual and auditory prudence, consistency and stamina scales. Prudence measures the impulsivity and the response inhibition as a result of the three different types of commission errors. Consistency measures the general reliability and variability of response times and it is used in order to measure the subject’s ability to be engaged to the task. Stamina, at last, compares the average reaction times of the correct responses during the first 200 trials with the last 200 trials, helping to identify problems of sustaining attention and effort over time. On the other hand, the FSAQ originates from separate auditory and visual attention scores, based on equal measures of visual and auditory vigilance, focus and speed. Vigilance is used to measure the levels of inattention as a result of the two different types of omission errors. Focus is extracted by all the correct responses and depicts the variability of the mental processing speed, while the speed reflects the mean reaction time for all correct responses throughout the test. Speed is useful for the identification of attention processing problems related to slow discriminatory mental processing.

As the CPT-II, IVA+Plus has a normative database in order to compare random subjects to ADHD or nonADHD norms. The normative group contains 1700 subjects, with ages 6-96. It is divided by gender and grouped by age as follows: 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17-18, 19-21, 22-24, 25-29, 30-34, 35-39, 40-44, 45-54, 55-65, and 66-96. The IVA+Plus DB is comprised only of people without known attention, learning, neurological, or psychological problems. All individuals who were in therapy or had a history of hyperactivity or attention problems were excluded. Also individuals who were on any type of medication or who had a history of neurological problems were excluded as well.

Comprehensive information about IVA + Plus can be found at <http://www.braintrain.com/>

## **Pediatric Attention Disorders Diagnostic Screener (PADDS)**

---

PADDS is a computer-based assessment system to screen for attention and executive function disorders in children ages 6 through 12. The PADDS integrates three important sources of information into a convenient format that is essential when making an Evidence-Based Assessment.

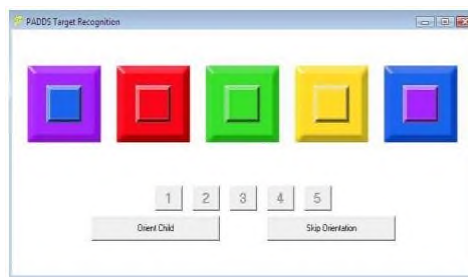
1. The CADI, or Computer Administered Diagnostic Interview, which is a comprehensive screening for patient history allowing identification possible co-morbid conditions.
2. The SNAP-IV parent and teacher rating scales, which are used to establish the DSM-IV criteria for identifying ADHD. The SNAP-IV was chosen based on its high effect size and sensitivity/specificity of greater than 90%.
3. Three newly developed cognitive measures, called the Target Tests of Executive Functioning (TTEF), which are a set of computer administered objective assessments of attention, and executive functioning.

The data collected from these components result in computer-generated reports, including a narrative and homographic display for strengthening the predictive power in determining the probability of an ADHD diagnosis.

It is Barkley’s model of behavioral inhibition (Barkley, 2007) which emphasizes the abilities to inhibit prepotent responses to stop a response and to mitigate interference combined with Miller and Cohen’s view of cognitive control as hinging on selective bias and neural recruitment that has served as the basis for the selection of stimuli and task demands employed by the Target Tests of Executive Functions subtests. The unifying theme used from both models is the ability to select/detect important information while inhibiting non-relevant or competing material in the service of the employment of the executive processes. Each of the

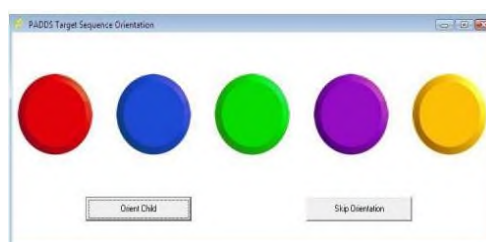
three Target Subtests was designed to force these controls while placing demands on various executive functions. Consideration was placed on practical issues regarding the need to develop tasks that were primarily not language based, that lend themselves to cross-cultural uses and that remained as simple or parsimonious as possible. In selecting stimuli, the following list of typical classroom demands was also considered.

The Target Tests of Executive Functioning are challenging and stimulating while requiring skills similar to those vital to success in the academic setting. By using Barkley's model of behavioral inhibition, the PADDs executive functioning tasks were designed to tap the underlying process of executive functioning, which attempts correlate more strongly with and even predict reported classroom performance and ADHD diagnosis. Target Recognition requires attention to detail, formulation of a response to changes in stimuli, modulation of emotions and persistence, and suppression of information. Target Recognition presents five large colored squares with smaller squares inside them. Below the squares are five small boxes labeled 1 to 5. The colored squares simultaneously blink on and off the screen at 1 ½ second intervals for a total of 153 presentations. The subject is taught a strategy to read from left to right and to count the number of large squares with small squares inside them of the same color and then to click on the corresponding number. It requires roughly 911 minutes completing.



**Figure 1 – Target Recognition Screen**

Target Sequencing requires the ability to avoid distraction, attention to detail, organization and sequencing during input of information, planning and organization of a response, modulation of emotion and sustained effort. Across 39 trials, five large colored circles are presented. A small square moves through them starting in the middle or at either of the end circles. The subject is taught to attend only to circles when the square matches it in color and to say the name of the color to him or herself while at the same time disregarding the circles that have squares with different color. Once the squares have moved through all five circles the child clicks on each of the circles that had matching colors in the order that they stated to him/her. First match first, second match second and last match last. This task has 39 items with an average completion time of 810 minutes.



**Figure 2 – Target Sequencing Screen**

Target Tracking requires the ability to organize two and three step instructions, and to recreate these instructions in the order presented while modulating emotions and sustaining effort across all trials. This subtest presents four colored Shapes at the top and bottom of the screen. The shapes will move one at a time from the top row to another shape in the bottom row and then reset. The computer creates two and three step moves that the subject must repeat/recreate in the same order seen. First move first, second move second and last move last. Target Tracking has 20 items and may take up to 7 or 8 minutes.

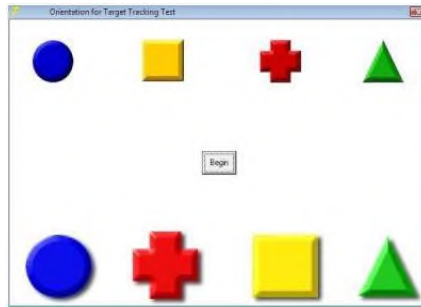


Figure 3– Target Tracking Screen

During each of the tasks, the clinician must complete behavioral observations of the subject. The Structured Assessment of Testing Behaviors form provides a framework to measure the occurrence of three types of behaviors: re-direction/re-instruction, fidgeting, and emotional reaction. The clinician uses stick marks to indicate each time any one of these three behaviors is exhibited and a total frequency for each task and any Medication Status is entered at the completion of the tests.

Comprehensive information about PADDs can be found at <http://www.targettest.com/>

## Behavioral Assessment Schedule for Children (BASC) Monitor for ADHD

The BASC Monitor system for ADHD collects and organizes various types of information, like treatment and behavior, over an indefinite period of time (months or years). Its main goal is to help the physicians to evaluate the effectiveness of treatment and to adapt it if it's necessary, by projecting the relationship between the behavioral changes and changes in treatment plan.

There are five main categories of information that could serve as an input into the software.

1. **Case Information:** Information about the child, parents, school, physician and other clinicians.
2. **Treatment History:** Analytical description of medications and behavioral treatments, including dosages, schedules and starting and ending dates.
3. **Behavior Ratings:** Ratings from the Teacher and Parent Monitor Ratings included in the BASC monitor system, which they come alongside with their relevant scales.
4. **Direct Observations:** Input data from the BASC Student Observation System.
5. **Other Variables:** This is one of the best part in the BASC monitor system, because it allows the user to define and track any other variables, like continuous performance tests, other behavioral rating scales, neuropsychological tests, neurofeedback progress, etc.

The software generates reports, which include tables and graphs depicting the trend of the behavioral indices over time. The user has many options for controlling the content and the length of the report, which is very useful for some purposes, such as giving feedback to a clinician.

Its primary purpose is to assist in treatment program design and to evaluate the effects of treatment for children ages 4-18. It is not suitable for assessment purposes because not all DSM-IV criteria are included in the scoring. Recommended use is for ages 6-11, for which the most evidence to support use is available

**Errore. L'origine riferimento non è stata trovata...**

Comprehensive information about BASC can be found at <http://www.pearsonassessments.com/>

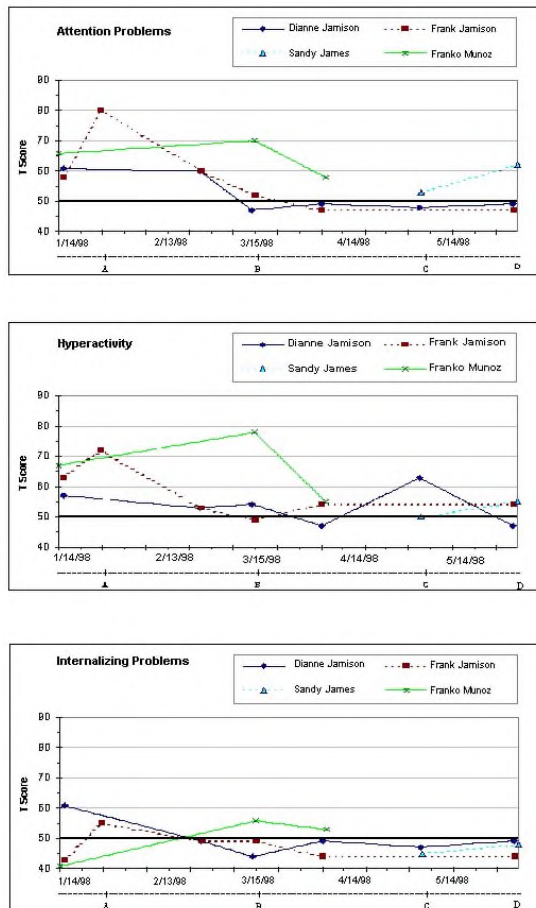


Fig. 4 - BASC Graph screens

## ADHD e-Monitoring - Free online symptom tracking tool

The ADHD e-Monitoring tool was developed by Dr. Walter Hultsch, physicist, pediatrician and ADHD coach from Munich, Germany. It is an internet-based symptom tracking tool monitoring medical or behavioral intervention in children with ADHD or other behavioral disorders. The online symptom tracking tool collects rating scale data and generates easily understandable tracking graphs that correlate behavioral and self-report changes with medical treatment of the child suffered from ADHD. The symptom tracking tool is based on the WFIRS-P Parent Report (Weiss & Weiss, 2004). All tracking should be printed and discussed with the child's physician, teachers or therapist.

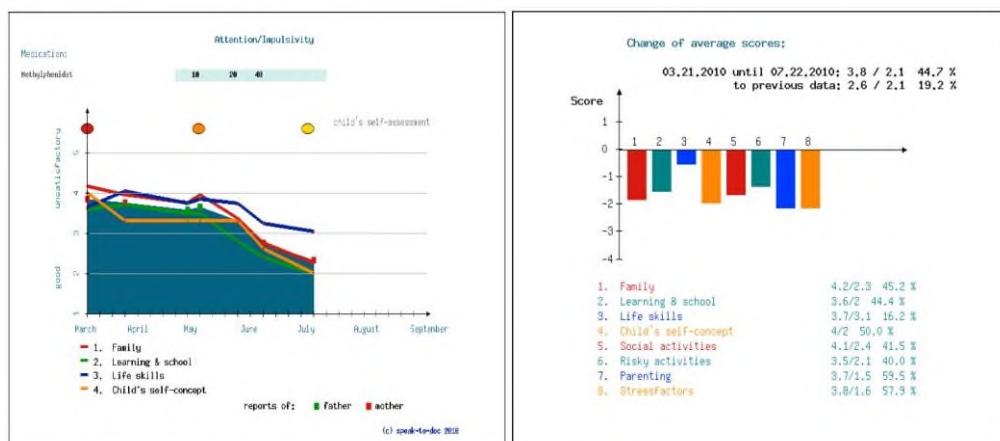


Figure 5 - Prints from ADHD e-Monitoring



Included in the ADHD Monitoring System there exist an online Family Counseling Program for the everyday stress encountered when parenting an ADHD child. This module helps families to learn the necessary skills for optimum interactions within the family. It involves training in communication skills, interpersonal relation skills, and skills in preempting and defusing conflict, conflict resolution, setting of boundaries, discipline and the inappropriate use of punishment.

Comprehensive information about ADHD e-Monitoring can be found at <http://www.adhd-monitoring.com/>

## ICT Tools for ADHD

While the gaming industry has a lot of parents concerned about violence and video game addiction, some gaming software is aimed at helping children and adults with ADHD. The general idea is that ADHD educational software increases focus and concentration. Since children are already fascinated by video games, it seems logical that children with ADHD can be taught to pay more attention through screens and joysticks than in a conventional classroom.

Some ADHD educational software goes even further by attaching sensors to the computer user’s head. These sensors—which are available for home computers—allow the user to control action on the screen with brainwaves. Focusing on the game means the player will do well; becoming distracted causes the player to lose ground.

No one suggests that children with ADHD be plopped in front of a video game and forgotten. ADHD educational software is simply meant to be another tool to exercise a child’s attention span. By increasing children’s attention spans through video game therapy, it is theorized that they can transfer their stronger attention span to other tasks such as schoolwork or chores.

## AttenGo (Web-Based)

The AttenGo training software addresses the root cause of the child’s ADHD and it is designed to improve learning skills, behavior, and daily functioning for children aged 6 and up.

AttenGo is based on neurocognitive technology that stimulates beta brain waves which improves core cognitive skills. These include attention, concentration, controlling impulsivity, organization skills, and responsiveness. Training will help the children to complete their homework and prepare for examinations. It will contribute to better self-management, self-control, as well as for their social skills.

The main difference of AttenGo with similar video and computer games is that it doesn’t rely on high levels of excitement and stimulation to keep children engaged. Instead, it provides a low-stimulus environment, similar to that of a classroom, using activities that will challenge and motivate the child in order to make progress and improve scores. It also provides real-time feedback, statistics, graphs, and scores that encourage the child to improve and help the parent to track progress.

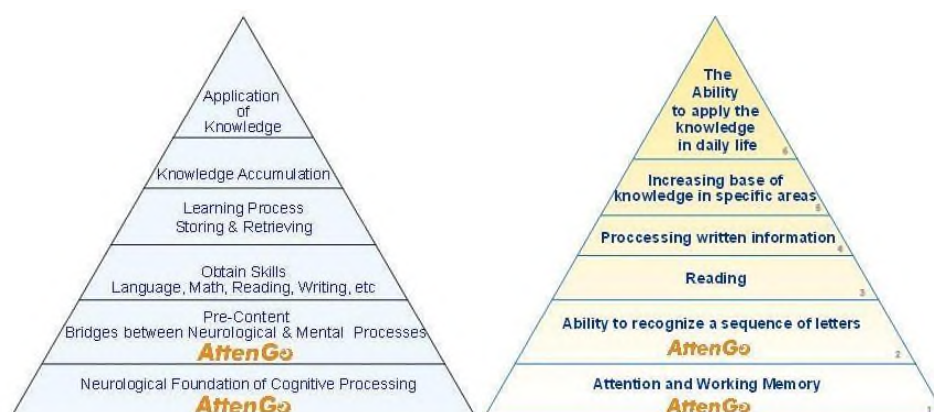


Figure 6 - Structure of Knowledge Application **Errore. L'origine riferimento non è stata trovata.**

AttenGo works at two levels:

- At the cognitive level it develops and strengthens attention, concentration, memory, planning, visual and auditory perception, and more.
- At the neurological level it stimulates the brain and quickens brain-wave activity. This improves attention and concentration. With better blood flow to the frontal lobe, the reception of neurotransmitters such as dopamine improves.

The whole process seems to be very easy. After signing up, an ADHD student will complete a short questionnaire and a ten-minute online assessment, then AttenGo creates a customized program tailored to the student's needs. Here it has to be noted that AttenGo is an auto-adapting software which monitors the student's progress and changes the exercises to make them fit their current performance at all times. Comprehensive information about AttenGo can be found at <http://www.attengo.com/>

## CP On Time (iOS & Android)

This iOS application is based on the belief that smartphone apps can provide practical, cost-effective personalized tools for individuals with adult ADHD. Towards this goal, Cognitive Psychiatry of Chapel Hill has developed the CP On Time based on their clinical experience with adult ADHD.

The app is designed to help those with adult ADHD get to work, school, or any other appointment in their day – or get to bed – on time every day. The app prompts the user to enter your personal bedtime, morning, or other routines, along with an estimate of time for each task in the routine, such as shower, brushing teeth, waking the children, etc. The app then asks you to enter the time of the relevant appointment (or bedtime), and how late you were the day before. Based on all of this data, we have created a formula to automatically set the alarm clock for the time that you need to start your routine, in order to be on time for your appointment or bedtime.



Figure 7 - Screens from the CP On Time app

CP On Time was recently re-designed to enable users to set as many customized alarms as needed throughout the day. The app was developed to be flexible, to work with any schedule and to accommodate the needs of any adult with ADHD.

This app contains some things that should be noted. First, there is no snooze button, which is very important! Snooze buttons create more time confusion for people suffering from ADHD. If someone needs some time to lie in bed before getting up, that can be added into your morning routine, but he/she should not use this time to snooze. Second, after entering a routine, the app does not give you a total time for the routine. When shown the total time for a routine, most people with ADHD will be surprised at the length of time; they will go back and change the times on their routine to make the total time shorter. This is common with underestimation of

time and leads to being chronically late. Third, ADHDers may be surprised at how early they need to start a given routine! For example, patients with ADHD often require 2+ hours in the morning to wake up, get through their routine, and get to work/school. This may seem excessive, but starting the day on time is critical to succeed throughout the day.

Comprehensive information about CP On Time can be found at <https://itunes.apple.com/us/app/adhdalarm/id483094194?mt=8>

## Adult ADHD (iOS)

Adult ADHD is an informative app for adults with ADHD or ADD. The app has the following functions:

1. An ADHD screening quiz that includes 50 questions, which have been found to be the most predictive of DSM-IV-TR symptoms consistent with ADHD. This quiz is adapted from the symptom checklist developed in conjunction with the World Health Organization and researchers from New York University and Harvard Medical School.
2. A medicine calculator. Based on your weight and age the calculator shows the maximum and average dose for all common ADHD drugs. Because the dose response to ADHD medication varies, this is only a guideline.
3. General information about ADHD in adults.
4. Advice (nutritional supplements, time management, etc) for adults with ADHD.
5. The latest news about ADHD in adults.

Comprehensive information about Adult ADHD can be found at <https://itunes.apple.com/us/app/adultadhd/id516244531?mt=8>

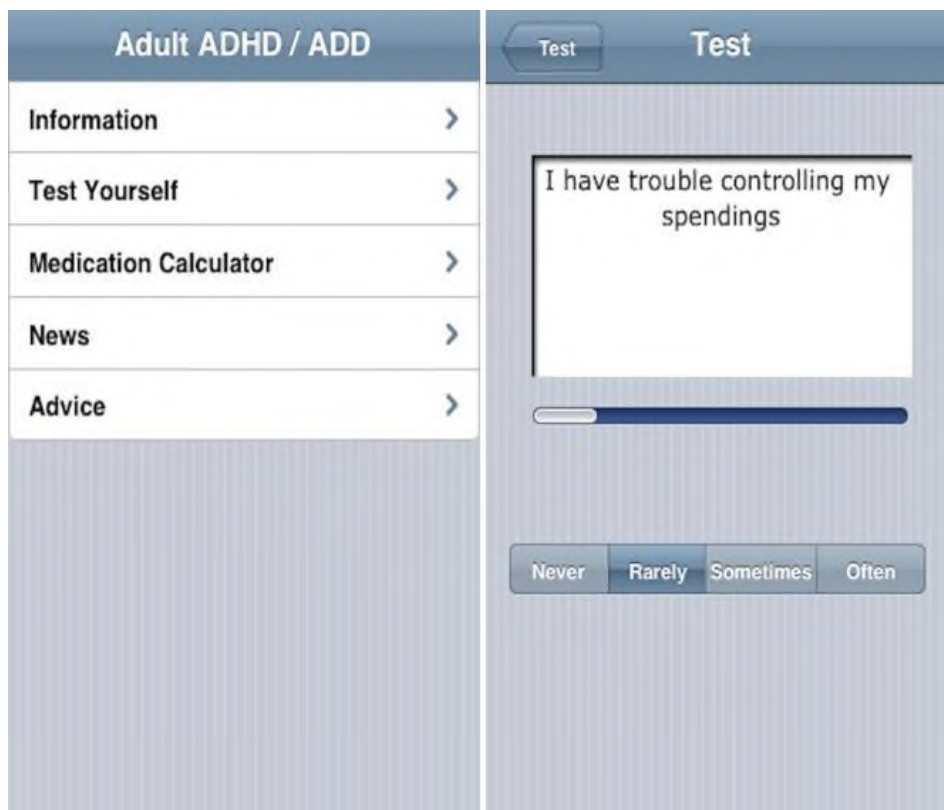


Figure 8 - Adult ADHD iPhone Screens

## Captain's Log Personal Trainer (PC)

---

Captain's Log Personal Trainer (CLPT) is based on extensive scientific research and clinical experience. The CLPT's 50 programs provide children with over 2000 different exercises to train twenty different cognitive skills. At the same time, children can target specific behavioral tracks, such as patience, focus, listening, response control and mental processing speed. The depth of the content provides them with a wide variety of challenging tasks to assure success in training whatever cognitive skills they select. It contains 10 different modules in order to train specific cognitive skills. Each one of these modules is briefly described next:

- **Attention Skills Developmental Module**

These eight programs begin with the simple exercises children need for head injuries or developmental disabilities.

- **Visual Motor Skills Module**

These seven popular programs play like video games but work to train hand-eye coordination visual processing, and fine motor control.

**Attention Skills The Next Generation Module**

This module can enhance higher level attention skills and memory. These three challenging programs build on the skills addressed in Attention Skills Developmental.

- **Conceptual Memory Skills Module**

This module can train the ability to classify, discriminate, and apply abstract rules to specific decisions, target impulse control, memory, processing speed, and reasoning.

- **Logic Skills Module**

This module features five engaging programs to help improve executive functioning and reasoning skills.

- **Numeric Concepts/Memory Skills Module**

These five challenging programs can also train working, immediate, and short-term memory, reasoning, visual discrimination, categorization and sequencing.



**Figure 1** - Select the items spoken in reverse order to successfully shoot the basketball in the correct hoop.

- **Real Life Working Memory Module**

These five programs are both practical and entertaining. They can learn ADHDers to put their working memory to work for them in real-life situations.

- **Working Memory Skills Module**

The five programs in this module train memory for names and faces, sequential pattern recognition, list recall, and more – skills that are vital for success in school and life.

- **Auditory Working Memory Module**

The five programs included in this module can help people with attention deficits improve both working memory and listening skills.

- **Featuring BrainPower™**

It is known that a positive relaxed attitude is a key component in building confidence and improving cognitive skills. People suffering from ADHD can now include brainwave training in conjunction with the Captain's Log Personal Trainer exercises. The BrainPower System incorporates neurofeedback technique, which is a proven treatment for ADHD **Errore. L'origine riferimento non è stata trovata.,Errore. L'origine riferimento non è stata trovata.**, to help the trainee to develop "C.H.A.R.M.", a Calm Happy Alert Relaxed Mental state, while they complete the progressively more difficult challenges of the Personal Trainer exercises. In order to track the brainwaves, BrainPower uses the Neurosky Mindwave device.

Comprehensive information about CLPT can be found at <http://www.braintrain.com>



Figure 2 - Neurosky Mindwave Device

## BrainBuilder (PC)

---

BrainBuilder is a computer-based brain-fitness training program that is designed to assess and build auditory and visual sequential processing abilities. With as little as ten minutes of daily mental exercise powerful gains can be made using BrainBuilder in short-term memory and thinking skills. In an intensive series of adaptive, interactive exercises, BrainBuilder trains the brain to expand its ability to sequentially process auditory and visual information. Sequential processing is fundamental to all learning activities, communication, social interaction and higher order cognitive functions.

It can be used for:

- Better memory and attention
- Sharper focus and clearer thinking
- Improved visual and auditory processing
- Enhanced brain health and longevity
- Increased BrainSpeed
- Stronger problem-solving skills

Comprehensive information about BrainBuilder can be found at <http://www.toolsforwellness.com/>

## Cogmed (Web-Based)

---

Cogmed Working Memory Training is a software-based program designed for children with ADD and ADHD. Cogmed claims that 80 percent of its participants have experienced significant improvement in their concentration and problem-solving skills. The five-week Cogmed program is coach-supported and conducted

at home with telephone assistance. The Cogmed training method consists of 25 training sessions done online, each 30-45 minutes long. Each session consists of a selection of various tasks that target the different aspects of working memory. The training is done online at home, in school, or at work. The standard program is five weeks long with five sessions every week.

Cogmed Working Memory Training is built around three age-specific software applications, for preschoolers, for School-age and for adults. All these versions are based on the same underlying design and algorithms, while their main differences are focused in the user interface.

There are four key-concepts of Cogmed software, which are responsible for the substantial and lasting benefits:

- **Very focused design – working memory improvement**  
The program challenges the user’s working memory capacity. The computerized, cognitive exercises are designed so as to target this key cognitive function that has been proven to be fundamental to executive function and attention. The details of the exercise design allow the program to be focused and yet provide slight variations.
- **Finely tuned difficulty level – you are always challenged**  
The difficulty level of the training is adjusted in real time by the software, based on the user’s performance. The highly fine-tuned calibration means that every user will always be training at the very edge of his or her cognitive capacity. This is true for many people, from a young child with severely impaired capacity, to an adult in good cognitive shape.
- **Highly personal support ensures you will complete the training**  
The program is carefully designed, rigorous, and focused on a key cognitive function. Moreover a Cogmed-trained coach always supports Cogmed training. The coach makes sure the user has the right profile for the training, and that the timing is right. The coach is responsible for providing the motivation, support, and feedback necessary to get the most out the training.
- **The improved working memory “generalizes” to behavior**  
When you improve your working memory capacity the change generalizes to your behavior. In other words, the change is translated to other things than just working memory. The research breakthrough is that by training a tightly defined cognitive function you create a cascading effect of improvements. You will be better able to pay attention, resist distractions, self-manage, and learn.

## ICT MONITORING FOR ADHD 2nd part

EDITED BY IRELAND PARTNER (TCD)

Name of App	Designed For	Main Purpose	Type of Observation
<b>To Provide Information About Behaviour</b>			
<b>YouCanHandleThemAll</b>	Designed for educators or parents as a quick resource for managing behaviour.	Based on a book by the same title, it allows you to choose a category and type of behaviour, describes the behaviour, identifies causes, and offers quick actions to help manage a student’s behaviour.	None
<b>To Observe Behaviour</b>			
<b>School Psychology Tools</b>	Psychologists	Organise work and observation	interval, duration, frequency, ABC
<b>iBAA Behavioral Assessment App</b>	Psychologists	Compile and summarise behavioural data	qualitative observations (guided with yes/no questions), frequency, interval, ABC, environmental assessment

<b>Behaviour Assessment Pro</b>	Parents, teachers, therapists, behaviour analysts, special educators, etc.	Functional behaviour analysis via guided questions about the behaviour	Guided questions like ABC
<b>Behavior Tracker Pro</b> (for autism)	Designed for therapist, aides, teachers, parents. Designed originally for autism.	To support behavioural treatment plans for children with Autism, but could be used more broadly. Generates graphs, allows you to record videos.	ABC, frequency, duration, and interval recording.
<b>eCove Observation Software</b>	Designed for administrators, teachers, coaches, peer observation, and researchers.	It seems the focus is strongly on improving the quality of teaching and teacher self-reflection, for example using the Bloom's Taxonomy	Over 200 tools are included (e.g. Autism Checklist, Class Environment Tool, Gross Motor Movements, Discipline Type, Interruptions by Student). Within these are frequency, duration, qualitative observations (tick boxes)
<b>Teacher's Class Behavior Pro</b>	Designed for teachers but could be used by parents, preschool or playschool instructors.	To monitor behaviours,	Seems only event/frequency recording.
<b>To Help Manage Classrooms &amp; Manage Behaviour (e.g. Intervention)</b>			
<b>Keep in Mind</b>	Psychologists, teachers, students, parents	To create behaviour plan and set reminders to implement an intervention	None
<b>Class Dojo</b>	Teachers	Help improve behaviour (via positive reinforcement and punishment)	Frequency/event recording
<b>Teachers Assistant Pro</b>	Teachers	Help with classroom organisation, record student actions	Frequency/event recording
<b>Class Tracker</b>	Teachers	Behaviour tracking and classroom management	Frequency/event
<b>Behaviour Management Book</b>	Designed for kids (and parents)	Includes positive statements and smiling faces (like a checklist for kids). For example, I can follow instructions, I can keep my hands to myself, then seems it can be set up to prompt that a reward should be given if they achieve a certain amount of positive statements.	None

## You Can Handle Them All

Designed for educators or parents as a quick resource for managing behaviour. Based on a book by the same title, it allows you to choose a category and type of behaviour, describes the behaviour, identifies causes, and offers quick actions to help manage a student's behaviour. Does not measure behaviour.

<https://itunes.apple.com/ie/app/you-can-handle-them-all/id454556259?mt=8>  
<http://www.masterteacher.com/Mobile-Apps>

1.79 Euro

iphone, ipad, ipod touch, android

1. Pedagogical principles – Not specified, but company's website discusses continuous professional development
2. Theoretical base –

3. Content – Discusses causes of behaviour and methods and techniques for managing behaviour (not specific to ADHD)
4. Target audience – Teachers and parents
5. Personalisation to meet needs of child – No
6. Feedback
7. Usability



## School Psychology Tools

Designed for psychologists, but the observation could be quite relevant for teachers and parents. Content for observations: interval, duration, frequency, ABC. Includes ability to record a peer for comparison. Says it can be customized for particular students, but focus is not on ADHD specifically.

<https://itunes.apple.com/us/app/school-psychology-tools/id435891534?mt=8>

<http://www.schoolpsychologytools.com/> (includes presentation and screenshots)

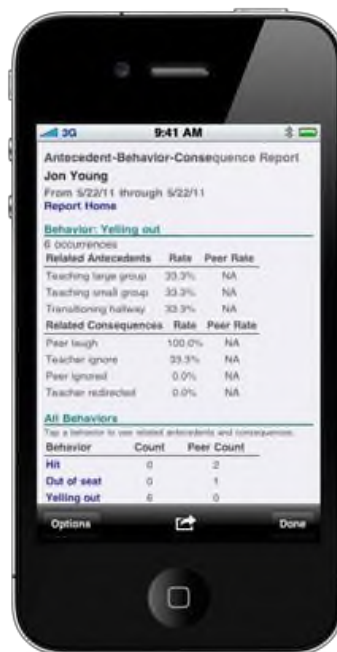
34.99 USD (no trial version)

iPhone, iPad, iPod touch & android

1. Pedagogical principles – No learning or e-learning aspect to it
2. Theoretical base



3. Content – student info, observation data, calendar and contact log for professional, generate reports, interventions/evaluations to do list, notes/voice memos, age calculator, stopwatch. Can be customized.
4. Target audience – Psychologists
5. Personalisation to meet needs of child – Yes
6. Feedback
7. Usability
8. Evidence Base



## iBAA Behavioral Assessment App

Designed for psychologists to help compile and summarise behavioural data. Includes qualitative observations (but guided with yes/no questions) as well as frequency, interval, ABC, environmental assessment and reporting. Can be customised to define behavioural categories and time intervals.

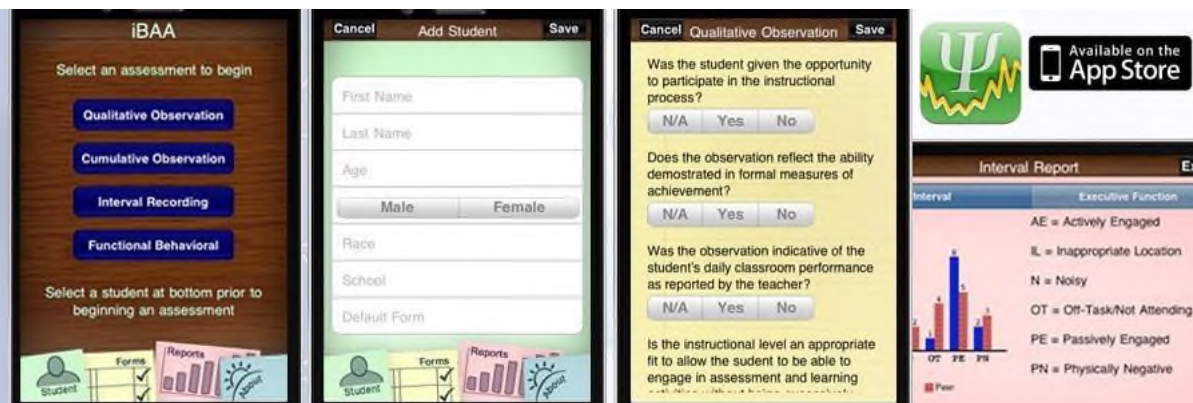
<https://itunes.apple.com/ie/app/ibaa/id383705019?mt=8>

<http://futurehelpdesigns.com/behavioralapps/ibaa/> (includes screenshots and video tour)

109.99 Euro (I have emailed about a trial version)

iPhone, iPad, iPod touch

1. Pedagogical principles – No learning or e-learning aspect to it
2. Theoretical base
3. Content – Student info, qualitative, cumulative (frequency), interval, functional behavioural (ABC), environmental analysis
4. Target audience – Psychologists
5. Personalisation to meet needs of child – Yes
6. Feedback
7. Usability



## Behaviour Assessment Pro (Vermont Behavioural Solutions)

Behaviour Assessment Pro is an iPhone, iPod touch and iPad application that identifies factors related to problem behaviours. BAP was designed by a Board Certified Behaviour Analyst for use by parents, teachers, therapists, behaviour analysts, special educators or anyone interested in supporting individuals with problem behaviours. Information is provided by informants to a three-part questionnaire. Multiple informants may enter information for each target behaviour. The entire assessment may take about 10-30 minutes to complete. The informant can complete the assessment in multiple sessions, if necessary. There is an option to use the actual written target behaviour definition in the questionnaire for a more personalized experience. Section 1 presents questions related to dimensional qualities of the target behaviour such as rate, duration and intensity. Section 2 presents questions about the function of the target behaviour, such as attention, escape, sensory stimulation, pain attenuation and tangibles. Each category receives an average score based upon the answers given. The behavioural functions with the highest scores receive follow-up questions in Section 3. BAP produces a

password protected report in a PDF format. Reports can be grouped by the individual, the behaviour or by the informant. You select the password prior to attaching the document to an email message. Recipients must enter the correct password to view the report. Reports include a bar graph of the mean scores for each function assessed in Section 2. The information obtained can be used to guide direct observations, systematic manipulations, behaviour support plan development or for IEP purposes.

1. Pedagogical Principles – Unclear, questionnaire unavailable
2. Theoretical Base – Not specified for any particular condition, more broadly aimed at behaviour problems in general
3. Content – target behaviour monitoring
4. Option to complete a written questionnaire to personalise answers for children/parents
5. Target Audience – parents, teachers, therapists, behaviour analysts, special educators or anyone interested in supporting individuals with problem behaviours.
6. Feedback – Teachers.net

*"This is very easy to use. It's only a first step in considering what a particular behaviour might be demonstrating, but it IS a first step!"*

Practical Autism Resources

*"Five Stars"*

*"A really nice app to help facilitate conversations around behaviours"*

*"Makes a great start for an FBA"*

*"This really fits for kids with autism"*

Autism Epicenter

*"A very good app to have installed on your iPhone"*

*"Very simple to use, with an intuitive interface"*

*"Behaviour Assessment Pro is a pretty sweet little iPhone app"*

*"Especially handy for professionals, but also for parents"*

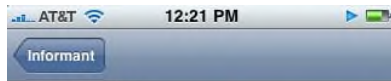
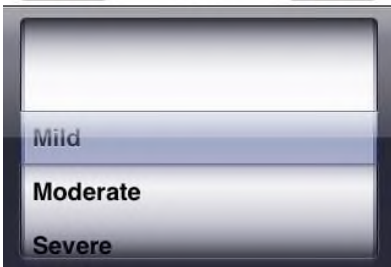
7. Usability – unclear as unavailable

Screenshots:



**Section 1**  
Q: How **severe** is the screaming?  
A: Mild: The behavior is disruptive but there is little risk to property or health

Back 2 of 5 Next



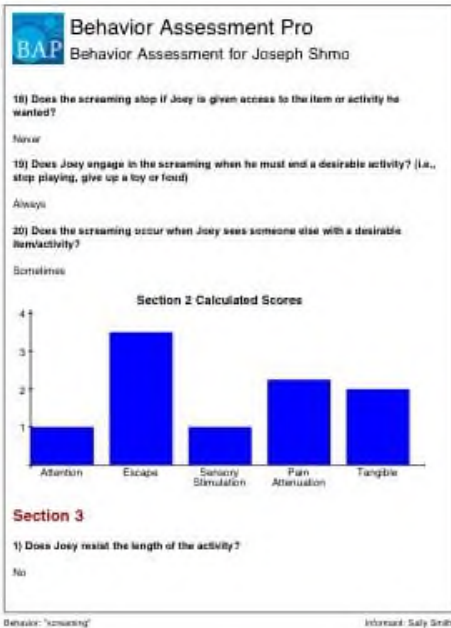
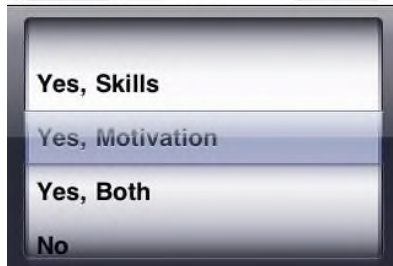
**Section 2**  
Q: Does the screaming stop shortly after an undesirable activity ends?  
A: Often

Back 7 of 20 Next



**Section 3**  
Q: Does Joey lack the skills and/or motivation to be successful?  
A: Yes, Motivation

Back 3 of 4 Next



## Behavior Tracker Pro (for autism)

Designed for therapist, aides, teachers, parents. Designed originally for autism and to support behavioural treatment plans for children with Autism, but could be used more broadly. Measures include ABC, frequency, duration, and interval recording. Generates graphs, allows you to record videos.

<https://itunes.apple.com/ie/app/behavior-tracker-pro/id319708933?mt=8>

<http://www.behaviortrackerpro.com/> (includes screenshots and video)

26.99 Euro

iPhone, iPad, iPod touch

1. Pedagogical principles - No learning or e-learning aspect to it, but website includes documents on ABA, functional assessment, teaching approaches, etc.
2. Theoretical base – Behaviourism and Applied Behaviour Analysis
3. Content - ABC, functional behaviour assessment, frequency and duration, interval recording
4. Target audience – Behaviour therapists and parents
5. Personalisation to meet needs of child – Yes, can be customized
6. Feedback
7. Usability



## eCove Observation Software

Designed for administrators, teachers, coaches, peer observation, and researchers. Depending on the version, different tools are included (e.g. Autism Checklist, Class Environment Tool, Gross Motor movements, Discipline Type, Interruptions by Student). It seems the focus is strongly on the quality of teaching and teacher self-reflection, for example using the Bloom's Taxonomy to classify level of questions asked or answered by either teachers or students. There are some tools that could be relevant to ADHD like interruptions by student tool, on task coding, time on task, talking out of turn, etc.

<https://itunes.apple.com/us/app/administrator-edition-ecove/id351062088?mt=8>

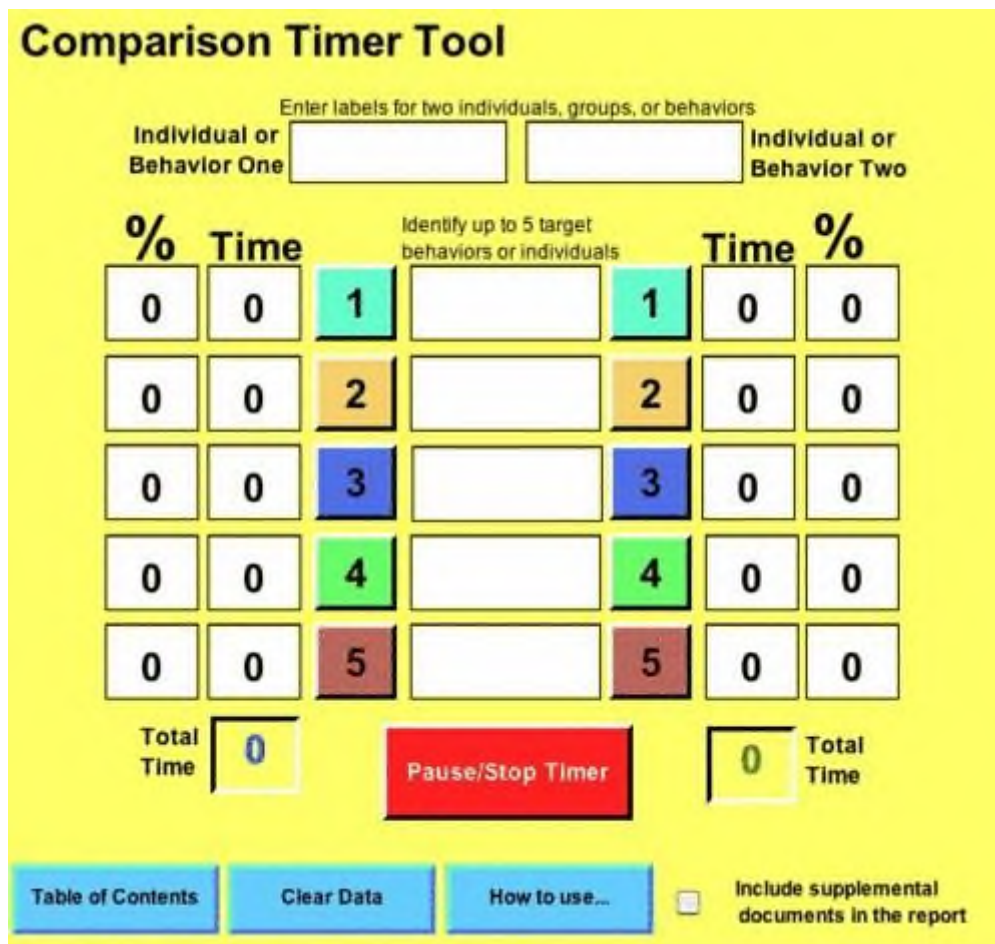
<http://www.ecove.net/> (includes videos)

Free for Trial (299 USD for each edition)

iPhone, iPad, iPod touch, android, netbook...

1. Pedagogical principles – No learning or e-learning aspect to it, but they do talk about improving teaching and learning through data-based observations and targeted professional development.
2. Theoretical base – Bloom's taxonomy of learning objectives and goals of the educational process
3. Content – checklists, scales, observation tools.
4. Target audience
5. Personalisation to meet needs of child
6. Feedback
7. Usability

The image displays two screenshots of the eCove Observation Software interface. The left window, titled "Talking Out of Turn - Mary Sample", features a "Simple Counter" with six categories: Ignore, Call On Student, Verbal Admonish, Record Name, Non-verbal Admonish, and Other Response. Each category has a counter set to 0 and a percentage of 0%. A "Total" counter at the bottom also shows 0. The right window, titled "Time On Task - Mary Sample", features a "Simple Timer" with five categories: On Task, Off Task-Social, Off Task-Academic, Off Task-Behavior, and Off Task-Other. Each category has a timer set to 0:00 and a percentage of 0%. A "Total" timer at the bottom also shows 0:00. Both windows include a "Clear" button and a help icon.



## Teacher's Class Behavior Pro

Designed for teachers but could be used by parents, preschool or playschool instructors. Can be used to monitor behaviours, but seems very basic and may only be event/frequency recording.

<https://play.google.com/store/apps/details?id=com.KekabeDevelopments.TeachersClassBehavior> (includes some screenshots)

0.69 Euro

1. Pedagogical principles – No learning or e-learning aspect to it
2. Theoretical base –
3. Content – It seems very basic and may only be event/frequency recording.
4. Target audience – Teacher
5. Personalisation to meet needs of child – Yes, but limited to 3 behaviours per child
6. Feedback –
7. Usability –



## Keep In Mind (Future Help Designs)

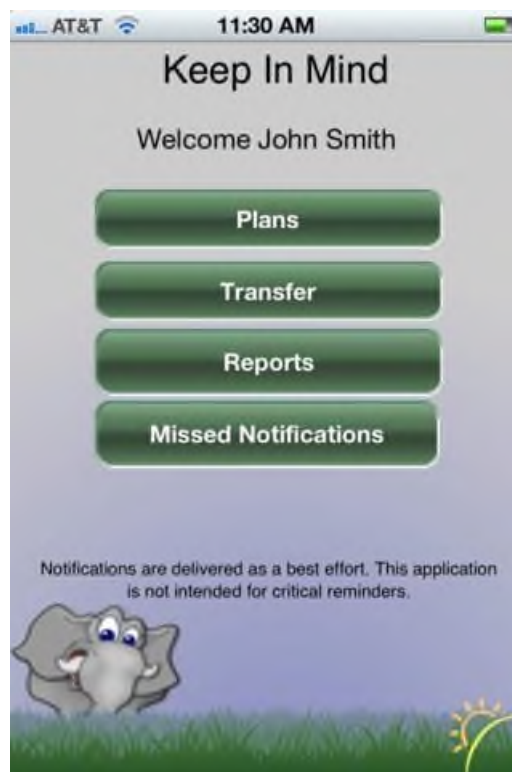
---

Behavioural intervention plans app for iPhone and iPod touch. Teachers/therapists/parents can create behaviour plans for individual children and set reminders to implement the intervention.

Reminders appear at predetermined random or variable intervals. Information can sync between multiple devices to manage message delivery. Users can wirelessly transfer plans to and from managed device to ease plan implementation and follow-up. A built-in functionality allows users to customise plans to be repurposed as templates for reuse.

1. Pedagogical principles – ADHD behaviours
2. Theoretical base – behaviour intervention plans
3. Content – targets prompt to implement intervention plans
4. Target audience - school psychologists, teachers, students, patients, and any individual looking for help implementing and following through on a change in behaviour.
5. Personalisation to meet needs of child – n/a
6. Feedback – none found
7. Usability

App video tour: <http://futurehelpdesigns.com/behavioralapps/keepinmind-behavioral-intervention-plan-bip/>



## Class Dojo

A classroom app that helps teachers to improve behaviour in their classrooms through positive reinforcement points for students (as well as negative points for inappropriate behaviour). It also captures and generates data on behaviour that teachers can share with parents and administrators. The app for use with classroom interactive whiteboard/ laptop/ smart phone, allows a teachers to set up avatars for children in the class, and instantly award points to the avatars as target behaviours are noticed such as participating, homework completion, arriving on time (these are customizable for each class). ClassDojo gives behaviour-tracking analytics and reports that can be shared with parents and administrators. The students can connect with their account, change their avatars and review their progress (rewards) and reflect on their behaviour with notes. Parents can be linked to accounts to receive behaviour reports.

### 1. Pedagogical principles and 2. Theoretical principles

For teachers: in some classrooms, more than 50% of class time is spent managing behaviour rather than delivering instruction; ClassDojo aims to greatly reduce this so teachers can do more teaching and less crowd control! In addition, for the first time, teachers have a painless way to focus on developing positive behaviour over time, rather than just logging referrals once it is too late to intervene.

For students: research suggests the shorter the time period between an action and feedback for that action, the greater is the effect of the reinforcement. Specific positive reinforcement helps students develop a sense of purpose in the classroom, enhancing intrinsic motivation over time. By giving students visibility and data on their own behaviour, ClassDojo makes class less disruptive and creates a more positive learning environment.

For parents: ClassDojo makes it easy to engage parents in their child's development, by allowing teachers to provide them with real-time data from the classroom - with just one click.

3. Content - positive reinforcement rewards and behaviour trend outputs
4. Target audience - teachers
5. Personalisation to meet needs of child – to an extent, teachers can customise target behaviours for rewards.
6. Feedback – positive teacher feedback on website
7. Usability – IPod touch, iPad, smart phone, laptop. Teachers can assign new sets of behaviours for different classes, and activate as needed. User friendly, no excessive data input. Video tour <http://www.classdojo.com/>

**Notes:** hand-outs for teacher and parents and students with details, presentation download, easy share with coworkers and parents.



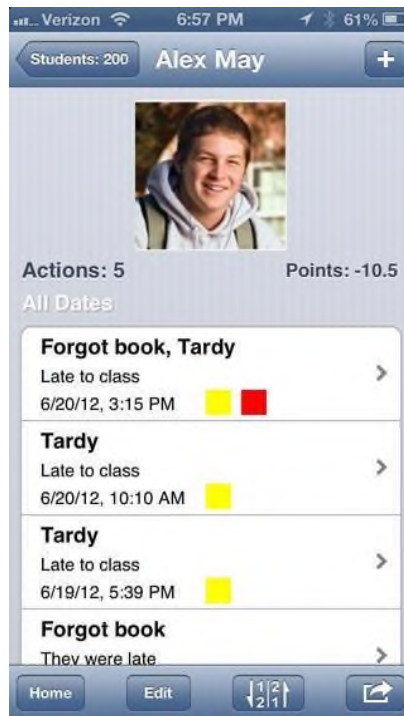
## Teacher's Assistant Pro

Teacher's Assistant is designed to help with classroom organisation, recording student actions and sharing with parents. Data can be email or sms message to parents and imported/exported to Dropbox. Main focus of app is recording target actions such as late of class, returned homework, not specifically orientated towards ADHD or specific behavioural concerns.

2. Pedagogical principles – n/a
3. Theoretical base – classroom organisation and management
4. Content – target behaviour monitoring as specified by the teacher, rewards for completion of tasks
5. Target audience – teachers for older children and adolescents
6. Personalisation to meet needs of child – can input specific target behaviours and record actions- no option to input reasons, antecedents, etc. No student input.
7. Feedback – Facebook page for user feedback
8. Usability – iPhone IOS, Mac – easy to set up and input data, share with parents. Stores some personal information about each student.

**Video:**

[http://www.teachersassistantpro.com/Teachers\\_Assistant\\_Pro\\_2\\_iPad\\_iPhone\\_Android\\_One\\_of\\_the\\_Best\\_Teacher\\_Apps%21/iOS.html](http://www.teachersassistantpro.com/Teachers_Assistant_Pro_2_iPad_iPhone_Android_One_of_the_Best_Teacher_Apps%21/iOS.html)

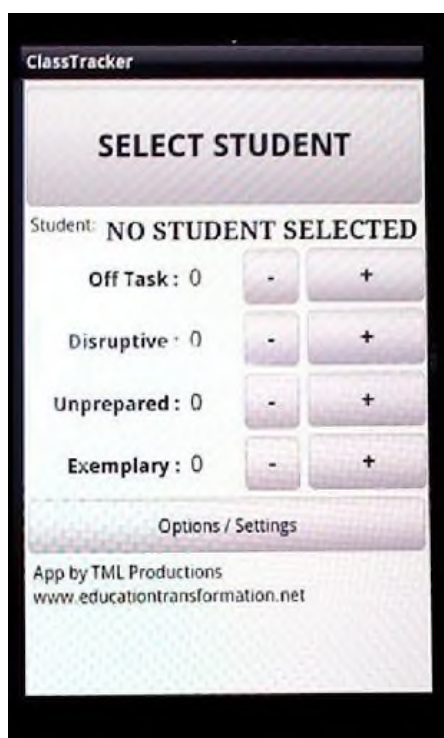


## Class Tracker – TML Productions

Class tracker lets users create custom counters to track multiple actions for individual students such as desirable behaviours, rule infractions, privilege uses, etc. Tap counter to record behaviours, both desirable and undesirable. Also used for tracking use of privileges (like limited hall passes), material distribution, taking turns, handing in permission slips, as well as creating class checklist. Created primarily for behaviour tracking and classroom management. Users can track data for multiple counters for each individual student. Totals for all counters for each student can be exported by email in CSV format to be opened in a spreadsheet and/or recorded elsewhere. Every time data is recorded it is stored with a date/time stamp

[https://play.google.com/store/apps/details?id=appinventor.ai\\_tloertscher.ClassTracker&hl=en](https://play.google.com/store/apps/details?id=appinventor.ai_tloertscher.ClassTracker&hl=en)

1. Pedagogical principles – non described
2. Theoretical base – behaviour tracking – to create totals output
3. Content - tap counter
4. Target audience - teachers
5. Personalisation to meet needs of child – non detailed
6. Feedback – some recommendations on website 7. Usability – screen shots seem a bit complicated



## **Behaviour Management Book**

Designed for kids (and parents). Includes positive statements and smiling faces (like a checklist for kids). For example, I can follow instructions, I can keep my hands to myself, then it can be set up to prompt that a reward should be given if they achieve a certain amount of positive statements.

<https://play.google.com/store/apps/details?id=com.techworx.behaviourbook> (includes screenshots)

Free

Android

1. Pedagogical principles – No learning or e-learning aspect to it
2. Theoretical base –
3. Content – Unclear
4. Target audience – Children and parents
5. Personalisation to meet needs of child – Unclear
6. Feedback – 7. Usability –

---

**PART C**

**THE DESIGN OF THE WHAAM  
APPLICATION**

---

# THE DESIGN OF THE WHAAM APPLICATION

EDITED BY THE ITALIAN PARTNER (ITD)

## 1. Architecture

The main outcome of the WHAAM project is a web-based application. It is based on a client-server architecture accessible via Internet by both desktop and mobile devices.

A possible architecture for the development of the WHAAM application is composed by the following technologies (Fig. 1):

- Apache HTTP Server as webserver, installed on a Unix operating system
- PHP as a server-side scripting language
- MySQL as relational database management system
- WebService as method of communication between mobile devices and the WHAAM webserver
- HTML as markup language
- CSS as style sheet language
- JavaScript as client-side scripting language
- Technologies for the mobile device

The mobile client application will access to a core of server features. The features will be available to the client application as WebService. The service exposes the APIs to manage part of assessment and intervention process supported by the WHAAM application. The figure 1 shows the architecture of WHAAM application:

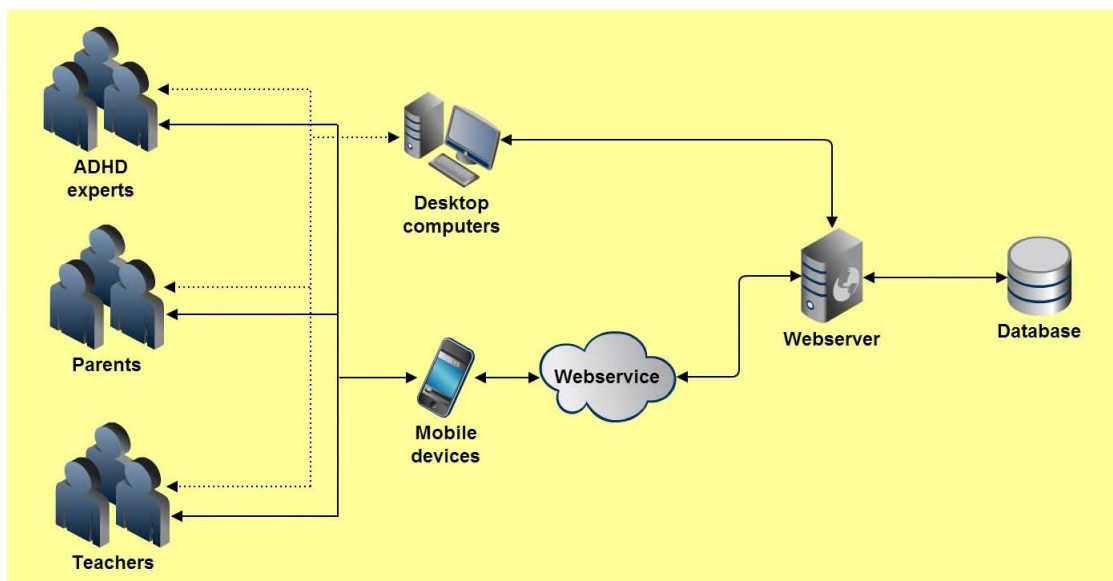


Figure 3 - WHAAM architecture



## 2. The WHAAM application design and development process

This section introduces the steps applied during the development process of the WHAAM application. In particular, the WHAAM development process is organized in the following tasks (Fig. 2):

- user stories: a description of what a user does or needs to do using the system. Each partner produces the user stories. The user stories are discussed with the development team in order to identify the final features to be implemented.
- sketches: A sketch is a rapidly executed freehand drawing, used as a quick way of graphically demonstrating an idea of WHAAM application user interface
- mockup: a collection of wireframes defining the application user interface
- graphic development: it provides the development team with the graphical design of the WHAAM application
- EER diagram: it allowed the development team to define relations and entities of the database used by the WHAAM application
- coding phase: it consists in designing, writing, testing, debugging the source code of the Web application

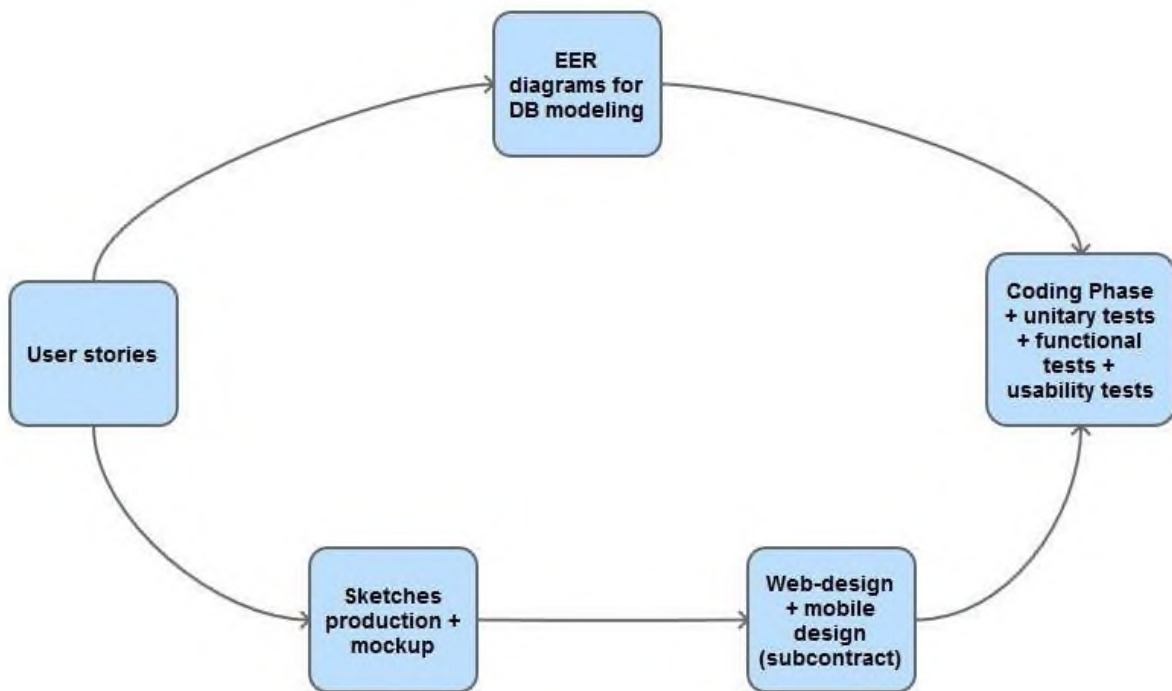


Figure4 - WHAAM application development process

### 2.1. User stories

According to Cohn (2004), user story “describes functionality that will be valuable to either a user or purchaser of a system or software.” (p. 4). User stories are a description of the application features written directly by customers. In order to identify the features to be developed in the WHAAM application, the partnership adopted the User Stories methodology in order to exploit the expertise acquired on ADHD matters, easily translating effective work processes in digital features.

User stories were written on a card according to the following selected structure:

<b>As a</b>	ROLE
<b>I want to</b>	SOMETHING
<b>So that</b>	BENEFIT
<b>Conversation</b>	SHORT DESCRIPTION

First of all, the story defines a role. For instance, in our case the roles defined in the proposal are: teachers, parents, and ADHD experts. Then stories identify the action associated to a feature (i.e. “I want to add a picture”) and its aim (i.e. “so that other users can view my face”). Sometimes it is not necessary to fill in also the “so that” field because the story is self-explanatory (i.e. “As a customer, I want to reserve a hotel room”, “As a customer, I want to cancel a reservation”, etc.).

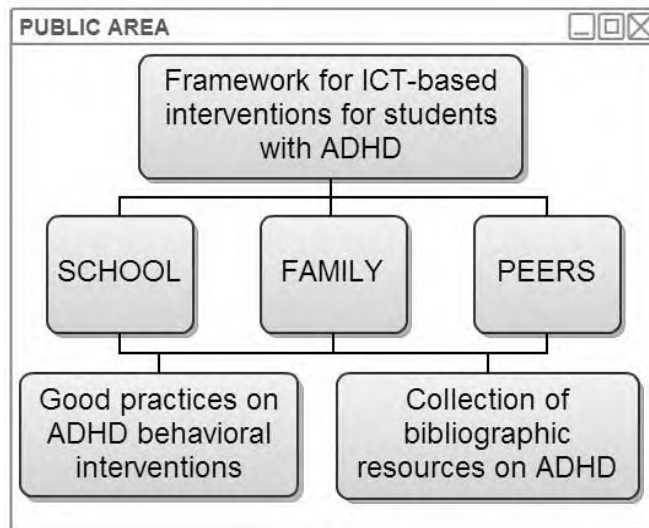
The last field is needed to clarify with a short description the variables associated to a story. For instance, in the story: “As a customer, I want to reserve a hotel room”, the related conversation could be: “Name; Surname; Email; Notes”. A star \* could be used to indicate the required fields (i.e. “Name\*, Surname\*, Email\*, Notes”). Sometimes the conversation field is left blank as well as the “so that” one for the same reasons.

Each partner wrote the stories about the possible WHAAM application features. These features were inspired to their experience with ADHD, but taking into account the following requirements specified in the WHAAM proposal:

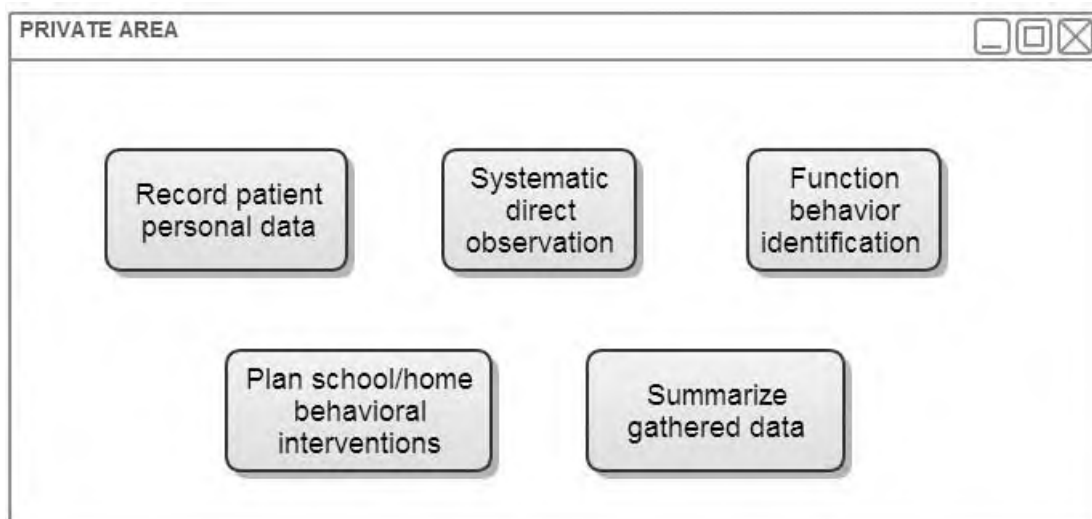
- three supported user roles (teachers, parents, and health professionals)
- a public area including general information about ADHD (Fig. 3) and some general suggestion about the features domains of the private area (Fig. 4)
- features to track behaviors
- features to allow health professionals to communicate with parents and teachers
- features to allow health professionals to assign tasks to parents and teachers
- features to summarize the gathered data

Taking into account the crucial role of the observation, we refined the domains of the WHAAM private application in the following way:

- features to record patient personal data, medical history for ADHD (i.e. birth history, general health history, behavior, school performance, family history), previous treatments or medications
- features to perform systematic direct observation at home/school
- features to identify the function of the observed behavior at home/school
- features to plan behavioral interventions at home/school □ features to summarize the gathered data



**Figure 5** - Contents of the public area of the WHAAM application



**Figure 6** - Possible features of the WHAAM application private area

## 2.2. Sketches production

Sketches guided by User Experience (UX) were aimed to put ideas (in our case gathered in the user stories document) to paper, exploring many possible interfaces taking always into account the experience from users' perspective. According to this perspective Sketches representing private, public and mobile interfaces which were produced by TCD, ITD, and AUTH. Sketches and WHAAM application scenario descriptions were shown to stakeholders according to the quality document produced by TCD. This allowed us to refine the application requirements through constructive feedbacks received from different contexts and different set of concerns in different partner countries.

## 2.3. Mockup

According to Wikipedia “Mockups in software development is to create user interfaces that show the end user what the software will look like without having to build the software or the underlying functionality” (<http://en.wikipedia.org/wiki/Mockup>).

In the WHAAM project, Mockups was a useful way to show how the user stories can be represented in user interfaces.

The WHAAM mockup has been produced using Balsamiq (<http://www.balsamiq.com>), an online tool that can be used for free for non-profit projects.

## 2.4. Graphic development

---

A subcontractor will design the user interface. The Mockup will show a click-through prototype to the webdesigner responsible for the graphic development of the WHAAM application.

The subcontract is aimed at producing the following outcomes:

- production of files (i.e. psd or other) containing the graphical design of the web-application
- coding templates in HTML, CSS and JavaScript according to the graphical design defined above
- production of files (i.e. psd or other) containing the graphical design of the native mobile application
  - production of graphical elements for the development of the native mobile application (i.e. background images, icons, etc.)

## 2.5. EER diagrams

---

According to Wikipedia “The enhanced entity–relationship (EER) model (or extended entity-relationship model) in computer science is a high-level or conceptual data model incorporating extensions to the original entity–relationship (ER) model” ([http://en.wikipedia.org/wiki/Enhanced\\_Entity-Relationship\\_Model](http://en.wikipedia.org/wiki/Enhanced_Entity-Relationship_Model)). ER is commonly used for describing a relational database in an abstract way.

Different EER modeling tools are available; MySQL workbench (<http://dev.mysql.com/doc/workbench/en/>) is an example of tool that includes capabilities for creating and manipulating EER models.

## 2.6. Coding phase

---

The coding final step will consist in designing, writing, testing, debugging the source code of the WHAAM desktop and mobile application.

# REFERENCES

---

## Introduction

---

Barkley, R. A. (1997). Advancing age, declining ADHD. *The American journal of psychiatry*, 154(9), 1323–5. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9286210>

Crone, D. A., & Horner, R. H. (2003). *Building Positive Behavior Support Systems in Schools: Functional Behavioral Assessment* (p. 171). New York, USA: The Guilford Press.

- Dixon, D. R., Vogel, T., & Tarbox, J. (2012). A Brief History of Functional Analysis and Applied Behavior Analysis. In J. L. Matson (Ed.), *Functional Assessment for Challenging Behaviors* (pp. 3–24). New York, NY: Springer New York. doi:10.1007/978-1-4614-3037-7\_2
- McCart, M. R., Priester, P. E., Davies, W. H., & Azen, R. (2006). Differential effectiveness of behavioral parent-training and cognitive-behavioral therapy for antisocial youth: a meta-analysis. *Journal of abnormal child psychology*, 34(4), 527–43. doi:10.1007/s10802-006-9031-1
- Mitchell, J. T., Benson, J. W., Knouse, L. E., Kimbrel, N. A., & Anastopoulos, A. D. (2013). Are Negative Automatic Thoughts Associated with ADHD in Adulthood? *Cognitive Therapy and Research*, 37(4), 851–859. doi:10.1007/s10608-013-9525-4
- Mueller, M. M., Nkosi, A., & Hine, J. F. (2011). Functional analysis in public schools: a summary of 90 functional analyses. *Journal of applied behavior analysis*, 44(4), 807–18. doi:10.1901/jaba.2011.44807
- Pelham, W. E., & Fabiano, G. a. (2008). Evidence-based psychosocial treatments for attention deficit/hyperactivity disorder. *Journal of clinical child and adolescent psychology*, 37, 184–214. doi:10.1080/15374410701818681
- Ramsay, J. R. (2007). Current status of cognitive-behavioral therapy as a psychosocial treatment for adult attention-deficit/hyperactivity disorder. *Current psychiatry reports*, 9(5), 427–33. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17915084>
- Safren, S. A., Sprich, S., Chulvick, S., & Otto, M. W. (2004). Psychosocial treatments for adults with attention-deficit/hyperactivity disorder. *The Psychiatric clinics of North America*, 27(2), 349–60. doi:10.1016/S0193-953X(03)00089-3

## General concept about ADHD

- 
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: American Psychiatric Association.
- Banaschewski, T., Coghill, D., Danckaerts, M., Dopfner, M., Rohde, L., Segeant, J. A., ... Zuddas, A. (2010). *ADHD and Hyperkinetic Disorder*. OPL Oxford University Press.
- Fayyad, J., De Graaf, R., Kessler, R., Alonso, J., Angermeyer, M., Demyttenaere, K., ... Jin, R. (2007). Cross-national prevalence and correlates of adult attention-deficit hyperactivity disorder. *Br. J. Psychiatry*, 190, 402–409.
- Kessler, R. C., Adler, L., Barkley, R., Biederman, J., Conners, C. K., Demler, O., ... Zaslavsky, A.M. (2006). The prevalence and correlates of adult ADHD in the United States: results from the national comorbidity survey replication. *Am. J. Psychiatry*, 163, 716–723.
- Polanczyk, G., Silva de Lima, M., Lessa Horta, B., Biederman, J., & Rohde, L. A. (2007). The Worldwide Prevalence of ADHD: A Systematic Review and Metaregression Analysis. *Am J Psychiatry*, 164, 942–948.

## Individual risk factors

- 
- Nigg, J. T. (2006). *What Causes ADHD?* New York: Guilford Press.
- Nigg, J. T., Nikolas, M., Burt, S. A. (2010). Measured Gene-by-Environment Interaction in Relation to Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 49, 863-873.

## Comorbidity and differential diagnosis

- Barkley, R. A. (1998). *Attention Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment*. New York, NY: Guilford Press.
- Barkley, R. A. (2006). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (3rd ed.). New York: Guilford Press.
- Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2002). The persistence of attention deficit/hyperactivity disorder into young adulthood as a function of reporting source and definition of disorder. *Journal of Abnormal Psychology*, 111, 279-289.
- Biederman, J., Newcorn, J., & Sprich, S. (1991). Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders. *American Journal of Psychiatry*, 148, 564-577.
- Brossard-Racine, M., Shevell, M., Snider, L., Bélanger, S. A., & Majnemer, A. (2012). Motor skills of children newly diagnosed with Attention Deficit Hyperactivity Disorder prior to and following treatment with stimulant medication. *Research in developmental disabilities*, 33(6), 2080–7. doi:10.1016/j.ridd.2012.06.003
- Cantwell, D. P., & Baker, L. (1992). Association between attention deficit-hyperactivity disorder and learning disorders. In S. E. Shaywitz & B. A. Shaywitz (Eds.), *Attention deficit disorder comes of age: Toward the twenty-first century* (pp. 145-164). Austin, TX: Pro-ed.
- Corkum, P., Moldofsky, H., Hogg-Johnson, S., Humphries, T. O. M., & Tannock, R. (1999). Sleep Problems in Children With Attention-Deficit/Hyperactivity Disorder: Impact of Subtype, Comorbidity, and Stimulant Medication. *Journal of the American Academy of Child & Adolescent Psychiatry*, 38(10), 1285–1293. doi: 10.1097/00004583-199910000-00018
- Corkum, P., Tannock, R., & Moldofsky, H. (1998). Sleep Disturbances in Children With Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 37(6), 637-646. doi: 10.1097/00004583-199806000-00014
- De Geus, F., Denys, D. A. J. P., Sitskoorn, M. M., & Westenberg, H. G. M. (2007). Attention and cognition in patients with obsessive-compulsive disorder. *Psychiatry and clinical neurosciences*, 61(1), 45–53. doi:10.1111/j.1440-1819.2007.01609.x
- Dell'Agnello, G. et al. per l'ADORE Study Group (2005). *Risultati preliminari dello studio ADORE in Italia: impatto significativo sui pazienti e la famiglia del disturbo da deficit dell'attenzione e iperattività (ADHD) non trattato*. Poster presentato al X Congresso Nazionale della Società Italiana di Psicopatologia (SOPSI), Roma 22-26 Febbraio.
- DuPaul, G. J., Gormley, M. J., & Laracy, S. D. (2013). Comorbidity of LD and ADHD: Implications of DSM-IV for assessment and treatment. *Journal of Learning Disabilities*, online first, DOI: 10.1177/0022219412464351
- Freeman, R. D. (2007). Tic disorders and ADHD: answers from a world-wide clinical dataset on Tourette syndrome. *European Child & Adolescent Psychiatry*, 16 (9), Suppl. 1, 1/15-1/23.
- Freeman, R. D., Fast, D. K., Burd, L., Kerbeshian, J., Robertson, M. M., & Sandor, P. (2000). An international perspective on Tourette syndrome: selected findings from 3500 individuals in 22 countries. *Developmental Medicine and Child Neurology*, 42 (7), 36-447.
- Frick, P. J., Kamphaus, R. W., Lahey, B. B., Loeber, R., Christ, M. A. G., Hart, E. L., & Tannenbaum, L. E. (1991). Academic underachievement and the disruptive behavior disorders. *Journal of Consulting and Clinical Psychology*, 59, 289-294.
- Gillberg, C. (2003). Deficits in attention, motor control, and perception: a brief review. *Archives of disease in childhood*, 88(10), 904–10. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1719331&tool=pmcentrez&rendertype=abstract>
- Jensen, P. S., Hinshaw, S. P., Kraemer, H. C., Lenora, N., Newcorn, J. H., Abikoff, H. B. et al. (2001). ADHD comorbidity findings from the MTA Study Comparing comorbid subgroups. *J AM Acad Child.*
- Kadesjö, B. & Gillberg, C. (2001). The comorbidity of ADHD in the general population of Swedish schoolage children. *J Child Psychol Psychiatry*, 42(4), 487-92.

- Larson, K., Russ, S. A., Kahn, R. S., & Halfon, N. (2011). Patterns of comorbidity, functioning, and service use for US children with ADHD, 2007. *Pediatrics*, 127(3), 462–70. doi:10.1542/peds.2010-0165.
- Masi, G., Millepiedi, S., Pezzica, S., Bertini, S., & Berloffia, S. (2006). Comorbidity e diagnosi differenziale del Disturbo da Deficit di Attenzione e Iperattività: implicazioni cliniche e terapeutiche. *Disturbi di attenzione e iperattività*, 1(1), 89-106.
- Owens, J. A. (2009). A Clinical Overview of Sleep and Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *J Can Acad Child Adolesc Psychiatry*, 18(2), 92–102.
- Owens, J. A. (2013). Sleep in Children with Attention Deficit/Hyperactivity Disorder. In E. C. C. Kushida (Ed.), *Encyclopedia of Sleep* (pp. 625–627). Waltham: Academic Press. doi: 10.1016/B978-0-12378610-4.00508-8
- Patel, N., Patel, M., & Patel, H. (2012). *ADHD and comorbid conditions, current directions in ADHD and its treatment*, Dr. Jill M. Norvilitis (Ed.). Retrieved from <http://www.intechopen.com/books/currentdirections-in-adhd-and-its-treatment/adhd-and-comorbidity>
- Pliszka, S. R. (1992). Comorbidity of attention-deficit hyperactivity disorder and overanxious disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 31, 197-203.
- Rust, J., & Golombok, S. (1999). *Modern psychometrics: The science of psychological assessment*. New York: Routledge.
- Schatz, D. B., & Rostain, A. L. (2006). ADHD with comorbid anxiety: A review of current literature. *J. Atten Disorder*, 10, 141-149.
- Semrud-Clikeman, M. & Bledsoe, J. (2011). Updates on attention-deficit/hyperactivity disorder and learning disorders. *Current psychiatry reports*, 13(5), 364–73. doi:10.1007/s11920-011-0211-5
- Semrud-Clikeman, M., Biederman, J., Sprich-Buckminster, S., Lehman, B. K., Faraone, S. V., & Norman, D. (1992). Comorbidity between ADDH and learning disability: A review and report in a clinically referred sample. *Journal of the American Academy of Child and Adolescent Psychiatry*, 31, 439-448. doi: 10.1097/00004583-199205000-00009
- Sheppard, B., Chavira, D., Azzam, A., Grados, M. A., Umaña, P., Garrido, H., & Mathews, C. A. (2010). ADHD prevalence and association with hoarding behaviors in childhood-onset OCD. *Depression and anxiety*, 27(7), 667–74. doi:10.1002/da.20691
- Shinn, M. R. & Walker, H. M. (2010). *Interventions for achievement and behavior problems in a three-tier model including RTI*. Washington, DC: NASP.
- Spencer, T., Biederman, J., Wilens, J. (1999). Attention-Deficit/Hyperactivity disorder and comorbidity. *Ped Clin North Am.*, 46, 915-927.
- Tannock, R. (2009). Attention-deficit/hyperactivity disorder with anxiety disorders. In T. E. Brown (Ed.), *ADHD Comorbidities* (pp. 131-156). Washington, DC: American Psychiatric Press.
- Wilens, T. E., Biederman, J., Brown, S., et al. (2002). Psychiatric comorbidity and functioning in clinically referred preschool children and school-age youths with ADHD. *J Am Acad Child Adolesc Psychiatry*, 41, 262-268.
- Willcutt, E. G., Pennington, B. F., Olson, R. K., Chhabildas, N., & Hulslander, J. (2005). Neuropsychological analyses of comorbidity between reading disability and attention deficit hyperactivity disorder: in search of the common deficit. *Developmental neuropsychology*, 27(1), 35–78. doi:10.1207/s15326942dn2701\_3

## Multimodal Treatment

- 
- Polidori, L., Muratori, P., Baldi, I., Lenzi, F., Manfredi, A., Ruglioni, L., ... Milone, A. (2010). Il trattamento multimodale per i disturbi del comportamento e aggressività in età evolutiva: l'esperienza di <<Al di là delle nuvole>>. *Disturbi di attenzione e iperattività*, 5(3), 173-198.
- Zuddas, A. (2010). Pharmacological treatments. In T. Banaschewski, D. Coghill, M., Danckaerts, M.

Dopfner, L. Rohde, J. A. Segeant, ... A. Zuddas (2010). *ADHD and Hyperkinetic Disorder*. OPL Oxford University Press (53-76).

## Assessment tools

- Abidin, R. R., & Santos, S. V. (2003). *Índice de Stress Parental—Manual* (Parenting stress index—manual). CEGOC, Lisboa.
- Abidin, R. R. (1995). *Parenting Stress Index Short Form Test Manual*. Charlottesville: Pediatric Psychology Press.
- Abikoff, H. B., Jensen, P. S., Arnold, L. E., Hoza, B., Hechtman, L., Pollack, S., . . . Hinshaw, S. (2002). Observed classroom behavior of children with ADHD: Relationship to gender and comorbidity. *Journal of abnormal child psychology*, 30(4), 349-359.
- Abikoff, H., & Gittelman, R. (1985). Classroom observation code - a modification of the stony-brook code. *Psychopharmacol Bull*, 21, 901-909.
- Abikoff, H., Gittelman-Klein, R., & Klein, D. F. (1977). Validation of a classroom observation code for hyperactive children. *Journal of Consulting and Clinical Psychology*, 45, 772-783.
- Abikoff, H., Gittelman-Klein, R., & Klein, D. F. (1980). Classroom observation code for hyperactive children: A replication of validity. *Journal of Consulting and Clinical Psychology*, 48, 555-565.
- Achenbach, T.M. (1991a). *Manual for Child Behavior Checklist/4-18 and 1991 Profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Achenbach, T.M. (1991b). *Integrative Guide for 1991 CBCL/4-18 YSR and TRF Profiles*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Arnold, E., O'Leary, S. G., Wolff, L. S. & Acker, M. M., (1993). The Parenting Scale: A measure of dysfunctional parenting in discipline situations. *Psychological Assessment*, 5(2)137-144.
- Barkley, R. (1997). *Defiant Children: a Clinician's manual for Parent Training* (Second Edition). New York: Guilford Press.
- Barkley, R. A., & Edelbrock, C. S. (1987). Assessing situational variation in children's behavior problems: The Home and School Situations Questionnaires. In R. Prinz (Ed.), *Advances in behavioral assessment of children and families* (Vol. 3, pp. 157-176). Greenwich, CT: JAI Press.
- Barkley, R. A., & Edwards, G. (2006). Diagnostic interview, behavior rating scale and the medical examination. In R. A. Barkley, *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (3rd ed., 337-368). New York: Guilford Press.
- Bavolek, S. J., & Keene, R. G. (1999). *Adult-Adolescent Parenting Inventory – AAPI-2: Administration and Development Handbook*. Park City, UT: Family Development Resources, Inc.
- Biancardi, A., & Stoppa, E. (1997). Il test delle campanelle modificato (TCM) una proposta per lo studio dell'attenzione in età evolutiva. *Psichiatria dell'Infanzia e dell'Adolescenza*, 64, 73-84.
- Blanchard, J. J., & Brown, S. B. (1998). Structured Diagnostic Interview Schedules. In: Alan S. Bellack and Michel Hersen (Eds). *Comprehensive Clinical Psychology*. Pergamon, Oxford (97-130). doi: 10.1016/B0080-4270(73)00003-1
- Brown, T.E. (2001). *Brown Attention-Deficit Disorder Scales for Children and Adolescents*. San Antonio, TX: Psychological Corporation.
- Bussing, R., Fernandez, M., Harwood, M., Hou, W., Garvan, C. W., Eyberg, S. M., & Swanson, J. M. (2008). Parent and teacher SNAP-IV ratings of attention deficit hyperactivity disorder symptoms - Psychometric properties and normative ratings from a school district sample. *Assessment*, 15(3), 317328. doi: 10.1177/1073191107313888
- Byles, J., Byrne, C., Boyle, M., & Offord, D. (1988). Ontario Child Health Study – reliability and validity of the general functioning subscale of the McMaster Family Assessment Device. *Family Process*, 27, 97 – 104.
- Cabeleira, L. C. J. (2009). *As dificuldades de leitura em alunos com ADHD*. Unpublished master's thesis.



- Universidade Fernando Pessoa. Available at:  
[http://bdigital.ufp.pt/bitstream/10284/1566/1/dm\\_luisacabeleira.pdf](http://bdigital.ufp.pt/bitstream/10284/1566/1/dm_luisacabeleira.pdf)
- Cairns, F. D., & Cammock, J. (1978). Development of a more reliable version of the Matching Familiar Figures Test. *Developmental Psychology*, 5, 555-560.
- Castro, L., Pablo, J., Gómez, J., Arrindell, W. A., & Toro, J. (1997). Assessing rearing behaviour from the perspective of the parents: A new form of the EMBU. *Soc. Psychiatry Psychia. Epidemiol.*, 32, 230-235.
- Cianchetti, C., Sannio Fancello, G. (2001). *Scale psichiatriche di autosomministrazione per fanciulli e adolescenti (SAFA)*. Organizzazioni Speciali, Firenze.
- Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of status: A cross-age perspective. *Developmental Psychology*, 18, 557-570.
- Conners, C. K. (1997). *Conners' rating scales - Revised: Technical manual*. Toronto, Multi-Health System.
- Cornoldi, C., & Cazzola, C. (2000). *Test AC-MT 11-14. Test di valutazione delle abilità di calcolo e problemsolving dagli 11 ai 14 anni*. Trento, Erickson.
- Cornoldi, C., & Colpo, G. (1998). *Prove di lettura MT per la scuola elementare- 2*. Firenze, Giunti Organizzazioni Speciali.
- Cornoldi, C. & Colpo, G. (1995). *Nuove Prove di lettura MT per la Scuola media Inferiore*. Firenze, Giunti Organizzazioni Speciali.
- Cornoldi, C., Gardinale, M., Pettenò, L., & Masi, A. (1996). *Impulsività e autocontrollo*. Trento, Erickson.
- Cornoldi, C., Lucangeli, D., & Bellina, M. (2002). *Test AC-MT 6-11 Test di valutazione delle abilità di calcolo e soluzione dei problemi*. Trento, Erickson.
- Cornoldi, C., Molin, A., & Marcon, V. (2004). Il questionario COM: uno strumento di identificazione di problematiche associate al DDAI. *Difficoltà di apprendimento*, 9(3), 391-412.
- Cornoldi, C., Pra Baldi, A., & Friso, G. (2010). *MT Avanzate -2 di lettura e matematica per il biennio della scuola secondaria di II grado*. Firenze, Giunti O.S.
- Dadds, M. R., & Powell, M. B. (1991). The relationship of interparental conflict and global marital adjustment to aggression, anxiety, and immaturity in aggressive and nonclinic children. *Journal of Abnormal Child Psychology*, 19(5), 553-567.
- Daley, D., Sonuga-Barke, E., & Thompson, M. (2003). Assessing expressed emotion in mothers of preschool AD/HD children: Psychometric properties of a modified speech sample. *British Journal of Clinical Psychology*, 42(1), 53-67.
- Di Nuovo, S. (2000). *Attenzione e concentrazione. 7 test e 12 training di potenziamento*, CD-ROM. Trento, Erickson.
- DuPaul, G. J. & Stoner, G. (2003). *ADHD in the schools: Assessment & intervention strategies* (2nd ed.). NY: Guilford Press.
- DuPaul, G. J., Power, T. J., Anastopoulos, A. D., & Reid, R. (1998). *ADHD rating scale-IV: Checklists, norms, and clinical interpretation*. New York: Guilford.
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy*, 9(2), 171-180.
- Fabiano, G. A., Pelham, Jr, W. E., Waschbusch, D. A., Gnagy, E. M., Lahey, B. B., Chronis, A. M., ... & Burrows-MacLean, L. (2006). A practical measure of impairment: Psychometric properties of the impairment rating scale in samples of children with attention deficit hyperactivity disorder and two school-based samples. *Journal of Clinical Child and Adolescent Psychology*, 35(3), 369-385. doi: 10.1207/s15374424jccp3503\_3
- Farré, A. F., & Narbona, J. N. (2003). *EDAH: escalas para la evaluación del trastorno por déficit de atención con hiperactividad: manual 5º ed*. Madrid: TEA.
- Forehand, R., & McMahon, R. J. (1981). *Helping the noncompliant child: A clinician's guide to effective parent training*. New York: Guilford.
- Frick, P.J. (1991). *The Alabama Parenting Scale, Unpublished Rating Scale*, University of Alabama.

- Furman, W., & Giberson, R. S. (1995). Identifying the links between parents and their children's sibling relationships. In S. Shurman (Ed.), *Close Relationships in Socio-emotional Development* (pp. 95-108). Norwood, NJ: Ablex.
- Gadow, K. D., Sprafkin, J., & Nolan, E. E. (1996). *ADHD School Observation Code*. Stony Brook, NY: Checkmate Plus.
- Goldberg, D. P., & Williams, P. A. (1988). *User's guide to the General Health Questionnaire*. Basingstoke: NFER-Nelson; 1988
- Gomes, A., Lopes, C.M., & Silva, C.F. (2010). EDAH, Escalas para a avaliação do Déficit de Atenção com Hiperactividade, de A. Farré e J. Narbona. *Manual Técnico* (1ª edição Portuguesa). Lisboa: CEGOC – TEA.
- Gomide, P. I. C. (2006). Inventário de Estilos Parentais – Percurso de Padronização e normatização. *Psicologia Argumento*, 25(48), 15-26.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry*, 38, 581-586.
- Goodman, R., Meltzer, H., Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study on the validity of the self-report version. *European Child and Adolescent Psychiatry*, 7, 125-130.
- Greenberg, M. D., & Waldman, I. D. (1993). Developmental Normative Data on The Test of Variables of Attention (T.O.V.A.). *Journal of Child and Adolescent Psychiatry*, 34(6), 1019-1030.
- Greene, R. W., Beszterczey, S. K., Katzenstein, T., Park, K., & Goring, J. (2002). Are students with ADHD more stressful to teach? Patterns of teacher stress in an elementary school sample. *Journal of Emotional and Behavioral Disorders*, 10(2), 79-89. doi: 10.1177/10634266020100020201
- Gresham, F. M., & Elliot, S. N. (1990). *Social skills rating system manual*. Circle Pines, MN: American Guidance Service.
- Harter, S. (1985). *Manual for the self-perception profile for children*. Denver, CO: University of Denver.
- Heaton, S. K., Chelune, G. J., Talley, J. L., Kay, G. G., & Curtiss, G. (1993). *Wisconsin Card Sorting Test (WCST) manual, revised and expanded*. Odessa, FL: Psychological Assessment Resources.
- Hill, C., Maskowitz, K., Danis, B., & Wakschlag, L. (2008). Validation of a Clinically Sensitive, Observational Coding System for Parenting Behaviors: The Parenting Clinical Observation Schedule. *Parenting*, 8(2), 153–185. doi:10.1080/15295190802045469
- JGCM 200 (2012). *International Vocabulary of Metrology (VIM)*. Bureau International des Poids et Mesures. Retrieved from [http://www.bipm.org/utlis/common/documents/jcgm/JCGM\\_200\\_2012.pdf](http://www.bipm.org/utlis/common/documents/jcgm/JCGM_200_2012.pdf)
- John, K., Gammon, D. G., Prusoff, B. A., & Warner, V. (1987). The Social Adjustment Inventory for Children and Adolescents (SAICA): testing of a new semistructured interview. *Journal of the American Academy of Child & Adolescent Psychiatry*, 26(6), 898-911. Available at <http://www.ncbi.nlm.nih.gov/pubmed/3429410>
- Johnston, C., & Mash, E. J. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology*, 18(2), 167-175.
- Jones, T. L., & Prinz, R. J. (2005). Potential roles of parental self-efficacy in parent and child adjustment: A review. *Clinical Psychology Review*, 25(3), 341-363.
- Junod, R. E. V., DuPaul, G. J., Jitendra, A. K., Volpe, R. J., & Cleary, K. S. (2006). Classroom observations of students with and without ADHD: Differences across types of engagement. *Journal of School Psychology*, 44(2), 87–104.
- Kaufman, J., Birmaher, B., Brent, D., Rao, U., Flynn, C., Moreci, P., Williamson, D., Ryan, N. (1997). Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL): initial reliability and validity data. *J Am Acad Child Adolesc Psychiatry*, 36(7), 980-8.
- Kovacs, M. (1992). *Children Depression Inventory (CDI) manual*. Toronto: Multi-Health Systems Inc.
- Landgraf, J. M., Abetz, L., Ware, J. E. (1999). *The CHQ User's Manual*. Boston, MA: Health Act.

- Lauth, G., Heubeck, B., & Mackowiak, K. (2006). Observation of children with attention deficit hyperactivity (ADHD) problems in three natural classroom contexts. *British Journal of Educational Psychology*, 76(2), 385-404.
- Leiter, R.G. (1979). *Instruction manual for the Leiter International Performance Scale*. Stoelting Co., Wood Dale, IL.
- Levine, M.N. (1982). *Leiter International Performance Scale: A handbook*. Western Psychological Services, Los Angeles, CA.
- Lopes, C. M. A. (2009). *Escala de avaliação do distúrbio de déficit de atenção/hiperatividade: Estudo para a aferição à população portuguesa (ADHD assessment scale: validation for portuguese population)*. (Unpublished master's thesis). Departamento de Educação da Universidade de Aveiro. Available at: <http://ria.ua.pt/bitstream/10773/1050/1/2010000288.pdf>
- Lucangeli, D., Tressoldi, P. E., & Fiore, C. (1998). *Test ABCA*. Trento, Erickson.
- Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Roberston, I. H. (2001). The differential assessment of children's attention: The Test of Attention in Children (TEA-Ch), normative sample and ADHD performance. *Journal of Child Psychiatry*, 42 (8), 1065-1081.
- March, J. S., Parker, J. D., Sullivan, K., Stallings, P., & Conners, C. K. (1997). The Multidimensional Anxiety Scale for Children (MASC): factor structure, reliability, and validity. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36, 554-565.
- March, R., Horner, R., Lewis-Palmer, T., Brown, D., Crone, D., Todd, A., et al. (2000). *Functional assessment checklist for teachers and staff (FACTS)*. Eugene, OR: Educational and Community Supports.
- Marcotto, E., Paltenaghi, B., & Cornoldi, C. (2002). La scala IPDDAI: contributo per la costruzione di uno strumento per l'identificazione precoce del disturbo da deficit di attenzione e/o iperattività. *Difficoltà di apprendimento*, 153-172.
- Margison, F. R. (2000). Measurement and psychotherapy: Evidence-based practice and practice-based evidence. *The British Journal of Psychiatry*, 177(2), 123-130. doi:10.1192/bjp.177.2.123
- Marzocchi, G. M., Oosterlaan, J., De Meo, T., Di Pietro, M., Pezzica, S., Cavolina, P., et al. (2001). Scala di valutazione dei Comportamenti Dirompenti per insegnanti (SCOD-I). *Giornale di Neuropsichiatria dell'Età Evolutiva*, 21, 378-393.
- Marzocchi, G. M., Portolan, S., & Usilla, A. (2006). *Autoregolare l'attenzione*, CD-ROM. Trento, Erickson.
- Marzocchi, G. M., Re, A.M., Cornoldi, C. (2010). *BIA-Batteria Italiana per l'ADHD*. Trento, Erickson.
- Merrel, K.W. (2001). Assessment of Children's Social Skills: Recent Developments, Best Practices, and New Directions. *Exceptionality*, 9(1&2), 3-18. Retrieved from [http://www.lionsquest.org/pdfs/merrel\\_articles.pdf](http://www.lionsquest.org/pdfs/merrel_articles.pdf)
- Moos, R.H., & Moos, B.S. (1981). *Family Environment Scale Manual*. Palo Alto, CA: Consulting Psychologist Press.
- Moreno, Jacob L. (1934). *1953 Who Shall Survive? Foundations of Sociometry, Group Psychotherapy and Sociodrama*. Rev. & enl. ed. Beacon, N.Y.: Beacon House.
- Newcomb, A. F., & Bukowski, W. M. (1983). Social impact and social preference as determinants of children's peer group status. *Developmental Psychology*, 19, 856-867.
- Ollendick, T. H. & Greene, R. W. (1998). Principles and Practices of Behavioral Assessment with Children. In: Alan S. Bellack and Michel Hersen (Eds), *Comprehensive Clinical Psychology*. Pergamon, Oxford (131-155). doi: 10.1016/B0080-4270(73)00012-2
- Pelham, W. E., Fabiano, G. A., & Massetti, G. M. (2005). Evidence-based assessment of attention deficit/hyperactivity disorder in children and adolescents. *Journal of Clinical Child and Adolescent Psychology*, 34, 449-476.
- Pelham, W. E., Gnagy, E. M., Greenslade, K. E., & Milich, R. (1992). Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 31(2), 210-218.

- Pennington, B. F., & Ozonoff, S. (1996). Executive Functions and Developmental Psychopathology. *Journal of Child Psychology and Psychiatry*, 37, 51-87.
- Perris, C., Jacobsson, L., Lindström, H., Von Knorring, L., & Perris, H. (1980). Development of a new inventory for assessing memories of parental rearing behaviour. *Acta Psychiatr Scand.*, 61, 265-274.
- Platzman, K. A., Stoy, M. R., Brown, R. T., Coles, C. D., Smith, I. E., & Falek, A. (1992). Review of Observational Methods in Attention Deficit Hyperactivity Disorder (ADHD): Implications for Diagnosis. *School Psychology Quarterly*, 7(3), 155-177.
- Raven, J., & Court, J. H. [Eds] (1989). Manual for Raven's Progressive Matrices and Vocabulary Scales. Research Supplement 4. Normative, Reliability and Validity Studies References. London: H.K. Lewis and Co. Ltd.
- Reynolds, C. R., & Kamphaus, R. W. (1998). *Behavioral assessment system for children manual*. Circle Pines, MN: American Guidance Service.
- Ribeiro, I. C. M. (2011). *ADHD*. (Unpublished master's thesis). Escola Superior de Educação Almeida Garrett. Available at: <http://recil.grupolusofona.pt/jspui/bitstream/10437/1499/1/Disserta%20Completa%202011.pdf>
- Riley, A. W., Lyman, L. M., Spiel, G., Doepfner, M., Lorenzo, M. J., Ralston, S. J., & Grp, A. S. (2006). The Family Strain Index (FSI). Reliability, validity, and factor structure of a brief questionnaire for families of children with AND. *European child & adolescent psychiatry*, 15, 72-78. doi: 10.1007/s00787-006-1010-0
- Robinson, E., & Eyberg, S. (1981). The dyadic parent-child interaction coding system: Standardization and validation. *Journal of Consulting and Clinical Psychology*, 49, 245-250. Manual and measure available at <http://www.incredibleyears.com/Measures/dpics-manual.pdf>
- Romppel, M., Braehler, E., Roth, M., & Glaesmer, H. (2013). What is the General Health Questionnaire-12 assessing? *Comprehensive Psychiatry*, 54(4), 406-413. doi:10.1016/j.comppsy.2012.10.010
- Rosvold, H. E., Mirsky, A. F., Sarason, I., Bransome, E. D., & Beck, L. H. (1956). A continuous performance test of brain damage. *Journal of Consulting Psychology*, 20, 343-350.
- Rutter, M. (1967). A children's behaviour questionnaire for completion by teachers: preliminary findings. *Journal of Child Psychology and Psychiatry*, 8, 1-11.
- Sandford, J. A., & Turner, A. (1995). *Intermediate Visual and Auditory Continuous Performance Test*. Richmond, VA: Braintrain, Inc.
- Sarason, I., Johnson, J., & Siegel, J. (1978). Assessing the Impact of Life Changes: Development of the Life Experiences Survey. *Journal of Consulting and Clinical Psychology*, 46(5), 932-946.
- Sartori, G., Job, R., & Tressoldi, P. E. (2007). *DDE-2 Batteria per la Valutazione della Dislessia e Disortografia Evolutiva*. Firenze, Giunti O.S.
- Sciutto, M. J., Terjesen, M. D., & Bender Frank, A. S. (2000). Teachers' knowledge and misperceptions of attention deficit/hyperactivity disorder. *Psychology in the Schools*, 37(2), 115-122.
- Shapiro, E.S. (1996). *Academic skills problems workbook: Direct assessment and Intervention* (2a. ed.). New York: Guilford Press.
- Shure, M. B., & Spivack, G. (1972). Means-ends thinking, adjustment, and social class among elementary school aged children. *Journal of Counseling and Clinical Psychology*, 38, 348-353.
- Skansgaard, E. P., & Burns, L. (1998). Comparison of DSM-IV ADHD combined and predominantly inattentive types: Correspondence between teacher ratings and direct observations of inattention, hyperactivity/impulsivity, slow cognitive tempo, and ODD and overt CD symptoms. *Child and Family Behavior Therapy*, 20, 1-14.
- Spitzer, R. L. (1983). Psychiatric diagnosis: Are clinicians still necessary? *Comprehensive Psychiatry*, 24, 399-411.
- Sprafkin, R. P., McGinnis, E., Goldstein, A. P., & Gershaw, N. J. (2002). *Manuale di insegnamento delle abilità sociali*. Trento, Erickson.

- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18, 643-662.
- Swanson, J. M., Kraemer, H. C., Hinshaw, S. P., Arnold, L. E., Conners, C. K., Abikoff, H. B., . . . Wu, M. (2001). Clinical relevance of the primary findings of the MTA: Success rates based on severity of ADHD and ODD symptoms at the end of treatment. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40(2), 168-179. doi: 10.1097/00004583-200102000-00011
- Tressoldi, P. E., & Cornoldi, C. (1991). *Batteria per la valutazione della scrittura e della competenza ortografica nella scuola dell'obbligo*. Firenze, Giunti O.S.
- Van der Oord, S., Van der Meulen, E. M., Prins, P. J. M., Oosterlaan, J., Buitelaar, J. K., & Emmelkamp, P. M. G. (2005). A psychometric evaluation of the social skills rating system in children with attention deficit hyperactivity disorder. *Behaviour research and therapy*, 43(6), 733-46. doi:10.1016/j.brat.2004.06.004
- Vio, C., Marzocchi, G., & Offredi, F. (1999). *Il bambino con deficit di attenzione/iperattività*. Trento, Erickson.
- Volpe, R. J., & Lorah, K. S. (2000). *The Systematic Hybrid Observation Code for Kids (SHOCK)*. Bethlehem, PA: Department of Education and Human Services, Lehigh University.
- Volpe, R. J., Di Perna, J. C., Hintze, J. M., & Shapiro, E. S. (2005). Observing Students in Classroom Settings: A review of Seven Coding Schemes. *School Psychology Review*, 34(4), 454-474.
- Walker, H. M., & Severson, H. (1992). *Systematic Screening for Behavior Disorders*. Longmont, CO: Sopris West.
- Wechsler, D. (1991). *The Wechsler intelligence scale for children—third edition*. San Antonio, TX: The Psychological Corporation.
- Wolraich, M. L., Feurer, I. D., Hannah, J. N., Baumgaertel, A., & Pinnock, T. Y. (1998). Obtaining systematic teacher reports of disruptive behavior disorders utilizing DSM-IV. *Journal of abnormal child psychology*, 26(2), 141-152.
- Wolraich, M. L., Lambert, E. W., Dotting, M. A., et al. (2003). Psychometric properties of the Vanderbilt ADHD diagnostic parent rating scale in a referred population. *Journal of Pediatric Psychology*, 28, 559 – 567.
- Wright, J. (2002). *ADHD: A School-Based Evaluation Manual*. Retrieved from <http://www.jimwrightonline.com/pdfdocs/adhdManual.PDF>

## Direct observation and Functional Assessment

- 
- Alter, P. J., Conroy, M. A., Rich Mancil, E., & Haydon, T. (2008). A Comparison of Functional Behavior Assessment Methodologies with Young Children: Descriptive Methods and Functional Analysis. *J Behav Educ*, 17, 200-219. doi: 10.1007/s10864-008-9064-3
- Bijou, S. W., Peterson, R. F., & Ault, M. H. (1968). Experimental field studies at the level of data and empirical concepts. *Journal of Applied Behavior Analysis*, 1(2), 175-191.
- Brosnan, J., & Healy, O. (2011). A review of behavioral interventions for the treatment of aggression in individuals with developmental disabilities. *Research in Developmental Disabilities*, 32, 437-446.
- Camp, E. M., Iwata, B. a, Hammond, J. L., & Bloom, S. E. (2009). Antecedent versus consequent events as predictors of problem behavior. *Journal of applied behavior analysis*, 42(2), 469-83. doi:10.1901/jaba.2009.42-469
- Conroy, M. a., Davis, C. a., Fox, J. J., & Brown, W. H. (2002). Functional Assessment of Behavior and Effective Supports for Young Children with Challenging Behaviors. *Assessment for Effective Intervention*, 27(4), 35-47. doi:10.1177/073724770202700405
- Csorba, J., Radvanyi, K., Regenyi, E., & Dinya, E. (2011). A study of behavior profiles among intellectually disabled people in residential care in Hungary. *Research in Developmental Disabilities*, 32, 1757- 1763.

- Derby, K., Wacker, D., & Sasso, G. (1992). Brief functional assessment techniques to evaluate aberrant behavior in an outpatient setting: A summary of 79 cases. *Journal of Applied Behavior*, 3(3), 713–721. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1279753/>
- Durand, V. M., & Crimmins, D. B. (1988). Identifying the variables maintaining self-injurious behavior. *Journal of autism and developmental disorders*, 18(1), 99–117. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/3372462>
- Durand, V. M., & Crimmins, D. B. (1992). *The Motivation Assessment Scale (MAS) administration guide*. Topeka, KS: Monaco and Associates.
- Emerson, E. (1995). *Challenging Behaviour. Analysis and Intervention in People with Learning Difficulties*. Cambridge: Cambridge University Press.
- Emerson, E. (2001). *Challenging behaviour: Analysis and intervention in people with severe learning disabilities*. Cambridge University Press.
- Finkel, a. S., Derby, K. M., Weber, K. P., & McLaughlin, T. F. (2003). Use of Choice to Identify Behavioral Function Following an Inconclusive Brief Functional Analysis. *Journal of Positive Behavior Interventions*, 5(2), 112–121. doi:10.1177/10983007030050020601
- Floyd, R. G., Phaneuf, R. L., & Wilczynski, S. M. (2005). Measurement Properties of Indirect Assessment Methods for Functional Behavioral Assessment: A Review of Research. *School Psychology Review*, 34(1), 58–73.
- Hall, S. S. (2005). Comparing descriptive, experimental and informant-based assessments of problem behaviors. *Research in developmental disabilities*, 26(6), 514–26. doi:10.1016/j.ridd.2004.11.004
- Harding, J. W., Wacker, D. P., Berg, W. K., Cooper, L. J., Asmus, J., Mlela, K., & Muller, J. (1999). An analysis of choice making in the assessment of young children with severe behavior problems. *Journal of Applied Behavior Analysis*, 32, 63–82.
- Haynes, S. N., & O'Brien, W. H. (2000). *Principles and practice of behavior assessment*. New York: Kluwer Academic/Plenum Publisher.
- Horner, R. H. (1994). Functional assessment: Contributions and future directions. *Journal of Applied Behavior Analysis*, 27, 401–404.
- Hurwits, S. & Minshaw, N. F. (2012). Methods of defining and observing behaviors. In J. L. Matson (ed.), *Functional Assessment for Challenging Behaviors*, Autism and Child Psychopathology Series. doi: 10.1007/978-1-4614-3037-7-6
- Iwata, B. a., DeLeon, I. G., & Roscoe, E. M. (2013). Reliability and Validity of the Functional Analysis Screening Tool. *Journal of Applied Behavior Analysis*, 46(1), 271–284. doi:10.1002/jaba.31
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis*, 27, 197–209. (Reprinted from *Analysis and Intervention in Developmental Disabilities*, 2, 3–20, 1982). Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/pmc1297798/>
- Matson, J. L., & Vollmer, T. (1995). *Questions About Behavioral Function (QABF)*. Baton Rouge: Disability Consultants, LLC. Translated into Italian, German, and Korean.
- Matson, J. L., Kuhn, D. E., Dixon, D. R., Mayville, S. B., Laud, R. B., Cooper, C. L., Malone, C. J., et al. (2003). The development and factor structure of the Functional Assessment for multiple causality (FACT). *Research in Developmental Disabilities*, 24(6), 485–495. doi:10.1016/j.ridd.2003.07.001
- Matson, J. L., Tureck, K., & Rieske, R. (2012). The Questions About Behavioral Function (QABF): current status as a method of functional assessment. *Research in developmental disabilities*, 33(2), 630–4. doi:10.1016/j.ridd.2011.11.006
- O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, K., & Newton, J. S. (1997). *Functional assessment and pro-gram development for problem behavior: A practical handbook*. Pacific Grove, CA: Brooks/Cole.

- Platzman, K. A., Stoy, M. R., Brown, R. T., Coles C. D., Smith, I. E., & Falek A. (1992). Review of Observational Methods in Attention Deficit Hyperactivity Disorder (ADHD): Implications for Diagnosis. *School Psychology Quarterly*, 7(3), 155-177.
- Sipes, M., & Matson, J. L. (2012). Functional Assessment for Challenging Behaviors. (J. L. Matson, Ed.). doi:10.1007/978-1-4614-3037-7
- Touchette, P. (1985). A scatter plot for identifying stimulus control of problem behavior. *Journal of Applied Behavior Analysis*, 4(18), 343–351. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1308031/>
- Vollmer, T. R., & Northup, J. (1996). Some implication of functional analysis for school psychology. *School Psychology Quarterly*, II, 76-92.
- Wright, J. (2002). ADHD: A School-Based Evaluation Manual. Retrieved from <http://www.jimwrightonline.com/pdfdocs/adhdManual.PDF>

## School context: Assessment

- 
- Abikoff, H. B., Jensen, P. S., Arnold, L. E., Hoza, B., Hechtman, L., Pollack, S., . . . Hinshaw, S. (2002). Observed classroom behavior of children with ADHD: Relationship to gender and comorbidity. *Journal of abnormal child psychology*, 30(4), 349-359.
- Anderson, J. C., Williams, S. C., McGee, R., & Silva, P. A. (1987). DSM-III disorders in preadolescent children: Prevalence in a large sample from the general population. *Archives of General Psychiatry*, 44, 69-76.
- Baptista, M. G. F. (2010). *Perturbação de hiperactividade e défice de atenção em contexto escolar – estudo exploratório das percepções dos professores sobre o impacto comportamental de crianças com ADHD em escolas de 1º ciclo* (ADHD in scholar context – exopatory study about teachers perceptions regarding the behavioural impact of children with ADHD in elementary schools). (Unpublished master’s thesis). Faculdade de Motricidade Humana, Universidade Técnica de Lisboa. Available at: <https://www.repository.utl.pt/bitstream/10400.5/3072/1/Tese%20Luis%20-DEFINITIVA.pdf>
- Barkley, R. A. (1990). Comprehensive evaluation of attention deficit disorder with and without hyperactivity as defined by research criteria. *Journal of Consulting and Clinical Psychology*, 58, 775-789.
- Barkley, R. A. (1997). Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*, 121, 65-94.
- Barkley, R. A., Murphy, K. R., & Fischer, M. (2008). *ADHD in Adults: What the Science Says*. New York: Guilford Press.
- Berg-Rolness, I. (2010). *Executive functions in preschool children - assessment and relation to ADHD symptoms*. Universitet I Oslo. Available at: <https://www.duo.uio.no/bitstream/handle/10852/17905/X.pdf?sequence=1>
- Berlin, L., Bohlin, G., Nyberg, L., & Janols, L. (2004). How Well Do Measures of Inhibition and Other Executive Functions Discriminate Between Children With ADHD and Controls? *Child Neuropsychology*, 10, 1-13
- Cabeleira, L. C. J. (2009). *As dificuldades de leitura em alunos com ADHD*. Unpublished master’s thesis. Universidade Fernando Pessoa. Available at [http://bdigital.ufp.pt/bitstream/10284/1566/1/dm\\_luisacabeleira.pdf](http://bdigital.ufp.pt/bitstream/10284/1566/1/dm_luisacabeleira.pdf)
- Cantwell, D. P., & Baker, L. (1991). Association between attention deficit-hyperactivity disorder and learning disorders. *Journal of Learning Disabilities*, 24, 88-95.
- Carlson, C. L., Booth, J. E., Shin, M., and Canu, W. H. (2002). Parent-, teacher-, and self-rated motivational styles in ADHD subtypes. *Journal of Learning Disabilities*, 35, 104-113.
- Daley, D., & Birchwood, J. (2009). ADHD and academic performance: why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom? *Child: care, health and development*, 35(6), 754–66. doi:10.1111/j.1365-2214.2009.01046.x

- Daley, D., Jones, K., Hutchings, J., & Thompson, M. (2009). Attention deficit hyperactivity disorder in preschool children: current findings, recommended interventions and future directions. *Child: care, health and development*, 35(6), 754–66. doi:10.1111/j.1365-2214.2009.00938.x
- Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Program (2003). *Identifying and Treating Attention Deficit Hyperactivity Disorder: A Resource for School and Home*. Washington, D.C., 20202. Available at [www.ed.gov/offices/OSERS/OSEP](http://www.ed.gov/offices/OSERS/OSEP)
- Dykman, R. A., Akerman, P. T., & Raney, T. J. (1994). Assessment and Characteristics of Children with Attention Deficit Disorder. Prepared for the *Office of Special Education Programs, Office of Special Education and Rehabilitative Services*, U.S. Department of Education.
- Ferreira, A. C. (2010). Auto-imagem em crianças com Hiperatividade e Défice de Atenção – a nossa realidade (Self-Image in Children with Attention-Deficit/Hyperactivity Disorder – our reality). (Unpublished master's thesis). Faculdade de Medicina da Universidade do Porto. Available at: <http://repositorio-aberto.up.pt/bitstream/10216/50131/2/Autoimagem%20em%20Crianas%20com%20Hiperatividade%20e%20Défice%20de%20Ateno%20%20A%20Nossa%20Realidade.pdf>
- Fisher, B., Cullen, F., & Turner, M. (2000). *The sexual victimization of college women*. Washington, DC: US. Department of Justice, National Institute of Justice, and Bureau of Justice Statistics.
- Frazier, T. W., Youngstrom, E. A., Glutting, J. J. & Watkins, M.W. (2007). ADHD and achievement: metaanalysis of the child, adolescent, and adult literatures and a concomitant study with college students. *Journal of Learning Disabilities*, 40, 49-65.
- Greene, R. W., Beszterczey, S. K., Katzenstein T., Park, K., & Goring, J. (2002). Are students with ADHD more stressful to teach? Patterns of teacher stress in an elementary school sample. *Journal of Emotional and Behavioral Disorders*, 10, 27-37.
- Harris, E. L., Schuerholz, L. J., Singer, H. S., Reader, M. J., Brown, J. E., Cox, C., Mohr, J., Chase, G. A., & Denckla, M. B. (1995). Executive Functions in Children with Tourette Syndrome and/or Attention Deficit Hyperactivity Disorder. *Journal of International Neuropsychological Society*, 1, 511-516.
- Howes, C., Hamilton, C. E. (1993). The changing experience of child care: Changes in teachers and in teacher-child relationships and children's social competence with peers. *Early Childhood Research Quarterly*, 8:15–32.
- Hoza, B., Pelham, W.E., Waschbusch, D.A., Kipp, H., and Owens, J.S. (2001). Academic task persistence of normally achieving ADHD and control boys: Performance, self-evaluations, and attributions. *Journal of Consulting and Clinical Psychology*, 69, 271-283.
- Ingersoll, B. (1988). *Your Hyperactive Child*. New York: Doubleday.
- Junode, R. E. V., DuPaul, G. J., Jitendra, A. K., Volpe, R. J., & Cleary K. S. (2006). Classroom observations of students with and without ADHD: Differences across types of engagement. *Journal of School Psychology*, 44, 87-104.
- Klingberg, T., Fernell, E., Olesen, P. J., Johnson, M., Gustafsson, P., Dahlstrom, K., Gillberg, C. G., Forssberg, H. & Westerberg, H. (2005). Computerized training of working memory in children with ADHD – a randomized, controlled trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 44, 177-186.
- Lauth, G., Heubeck, B., & Mackowiak, K. (2006). Observation of children with attention deficit hyperactivity (ADHD) problems in three natural classroom contexts. *British Journal of Educational Psychology*, 76(2), 385-404.
- LeFever, G. B., Villers, M. S., Morrow, A. L., & Vaughn, E., III (2002). Parental perceptions of adverse educational outcomes among children diagnosed and treated for ADHD: a call for improved school/provider collaboration. *Psychol Schools*, 39, 63-71.
- Leff, S. S., Thomas, D. E., Shapiro, E. S., Paskewich, B., Wilson, K., Necowitz-Hoffman, B. and Abbas, F.



- J. (2011). Developing and Validating a New Classroom Climate Observation Assessment Tool. *Sch Violence*, 1, 10(2): 165–184. doi:10.1080/15388220.2010.539167. Available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3106103/>
- Lima, A., Teixeira, V., Serôdio, R. G., & Cruz, O. (2008). Escala de Problemas de Comportamento em Crianças de Idade Escolar (Behavior Problems in School Age Children Scale). *Proceedings of XIII Conferência Internacional de Avaliação Psicológica: Formas e Contextos*. Braga, Portugal. Available at: [http://sigarra.up.pt/fpceup/pt/publs\\_pesquisa.show\\_publ\\_file?pct\\_gdoc\\_id=5759](http://sigarra.up.pt/fpceup/pt/publs_pesquisa.show_publ_file?pct_gdoc_id=5759)
- Lopes, C. M. A. (2009). *Escala de avaliação do distúrbio de défice de atenção/hiperactividade: Estudo para a aferição à população portuguesa* (ADHD assessment scale: validation for portuguese population). (Unpublished master's thesis). Departamento de Educação da Universidade de Aveiro. Available at <http://ria.ua.pt/bitstream/10773/1050/1/2010000288.pdf>
- Maia, C., Guardiano, M., Viana, V., Almeida, J. P., & Guimarães, M. J. (2011). Self-Perception in Children with Attention-Deficit/Hyperactivity Disorder. *Acta Med Port*, 24(S2), 493-502. Available at: <http://www.actamedicaportuguesa.com/pdf/2011-24/suplemento-originais/493-502.pdf>
- Mariani, M. & Barkley, R. A. (1997) Neuropsychological and academic functioning in preschool children with attention deficit hyperactivity disorder. *Developmental Neuropsychology*, 13, 111-129.
- Marzocchi, G. M., Oosterlaan, J., Zuddas, A., Cavolina, P., Geurts, H., Redigolo, D., Vio, C., & Sergeant, J. A. (2008). Contrasting Deficits on Executive Functions between ADHD and reading Disabled Children. *Journal of Child Psychology and Psychiatry*, 49, 543-552.
- Mash, J., and Barkley, R. A. (2003). *Child psychopathology* (2nd ed.). Guilford Press, New York.
- McGee, R., Partridge, F., Williams, S. & Silva, P. A. (1991.) A twelve-year follow-up of preschool hyperactive children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 224-232.
- Meehan, B. T., Hughes, J. N., Cavell, T. A. (2003). Teacher-student relationships as compensatory resources for aggressive children. *Child Development*, 74:1145–1157.
- Molina, B. S., Hinshaw, S. P., Swanson, J. M. et al. (2009). The MTA at 8 years: prospective follow-up of children treated for combined-type ADHD in a multisite study. *J Am Acad Child Adolesc Psychiatry* 48, 484-500.
- Oosterlaan, J., Scheres, A., & Sergeant, J. A. (2005). Which Executive Functioning Deficits Are Associated With AD/HD, ODD/CD and Comorbid AD/HD+ODD/CD? *Journal of Abnormal Child Psychology*, 33, 69-85.
- Pennington, B. F., & Ozonoff, S. (1996). Executive Functions and Developmental Psychopathology. *Journal of Child Psychology and Psychiatry*, 37, 51-87.
- Pereira, A. T., Maia, B. R., Marques, M., et al. (2008). Factor structure of the Rutter Teacher Questionnaire in Portuguese children. *Rev Bras Psiquiatr*, 30(4), 322-327. Available at <http://www.scielo.br/pdf/rbp/v30n4/a04v30n4.pdf>
- Platzman, K. A., Stoy, M. R., Brown, R. T., Coles C. D., Smith, I. E., & Falek A. (1992). Review of Observational Methods in Attention Deficit Hyperactivity Disorder (ADHD): Implications for Diagnosis. *School Psychology Quarterly*, 7(3), 155-177.
- Rabiner, D., Coie, J. D. & the Conduct Problems Prevention Research Group (2000). Early attention problems and children's reading achievement: a longitudinal investigation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 859-867.
- Raggi, V. L. (2008). *Development and preliminary testing of a brief, behavioral intervention to address the homework-related problems of middle school students with ADHD*. Retrieved from <http://drum.lib.umd.edu/bitstream/1903/8487/1/umi-umd-5535.pdf>
- Raggi, V. L. and Chronis, A. M. (2006). Interventions to Address the Academic Impairment of Children and Adolescents with ADHD. *Clinical Child and Family Psychology Review*, 9(2), 85-111. doi: 10.1007/s10567-006-0006-0

- Safren, S. A., Otto, M. W., Sprich, S., Winett, C. L., Wilens, T. E., Biederman, J. (2005). Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms. *Behavior Research and Therapy*, 43, 831-842.
- Smith, B.H., Molina S.G., and Pelham, W.E. (2002). The Clinically Meaningful Link Between Alcohol Use and Attention Deficit Hyperactivity Disorder. *Alcohol Research & Health*, 26(2), 122-129.
- Sonuga-Barke, E. J. S., Dalen, L. & Remington, B. (2003) Do executive deficits and delay aversion make independent contributions to preschool attention-deficit/hyperactivity disorder? *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 1335–1342.
- Spira, E. G. & Fischel, J. E. (2005) The impact of preschool inattention, hyperactivity, and impulsivity on social and academic development: a review. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 46, 755–773.
- Stuhlman, M., Pianta, R. (2001). Teachers' narratives about their relationships with children: Associations with behavior in classrooms. *School Psychology Review*, 31:148–163.
- Weiss, G., & Hechtman, L. T. (1993). *Hyperactive Children Grown Up*. New York: Guilford Press.
- Zentall, S. S. (1993). Research on the Educational Implications of Attention Deficit Hyperactivity Disorder. *Exceptional Children*, 60, 143-153. Available at [http://www.edst.purdue.edu/zentall/resume/articles/93research\\_implic.pdf](http://www.edst.purdue.edu/zentall/resume/articles/93research_implic.pdf)

## School context: Intervention

- 
- Brock S. E. (2002). *Helping the Student With ADHD in the Classroom*. Published by National Association of School Psychologists (NASP). Retrieved from <http://www.nasponline.org/resources/handouts/special%20needs%20template.pdf>
- Broussard, C., & Northup, J. (1995). An approach to functional assessment and analysis of disruptive behavior in regular education classrooms. *School Psychology Quarterly*. Retrieved from <http://psycnet.apa.org/journals/spq/10/2/151/>
- Burke, M. D., Hagan-Burke, S., & Sugai, G. (2003). The efficacy of function-based interventions for students with learning disabilities who exhibit escape-maintained problem behaviors: Preliminary results from a single-case experiment. *Learning Disabilities Quarterly*, 26 (1), 15-25.
- Costa, C. J. (2012). *A Importância do Jogo no processo de Ensino e Aprendizagem de alunos com Perturbação de Hiperatividade e Défice de Atenção* (Play importance in teaching-learning process of children with ADHD. (Unpublished master's thesis). Escola Superior de Educação João de Deus. Available at: [http://comum.rcaap.pt/bitstream/123456789/2595/1/Disserta%C3%A7%C3%A3o\\_CarinaJoanaCosta.pdf](http://comum.rcaap.pt/bitstream/123456789/2595/1/Disserta%C3%A7%C3%A3o_CarinaJoanaCosta.pdf)
- Davey, B. J., & Lignugaris/Kraft, B. (2006). A practical approach to functional behavioral assessment in a public (state supported) school. *Emotional and Behavioural Difficulties*, 10(4), 255–268. doi:10.1177/1363275205058998
- Delquadri, J., Greenwood, C. R., Whorton, D., Carta, J. 1., & Hall, R. V. (1986). ClassWide peer tutoring. *Exceptional Children*, 52, 535-542.
- Dupaul, G. J., & Eckert, T. L. (1998). Academic Interventions for students with Attention-Deficit/Hyperactivity disorder: a review of the literature. *Reading & Writing Quarterly: Overcoming Learning Difficulties*, 14 (1), 59–82.
- DuPaul, G. J., & Weyandt, L. L. (2006). School based Intervention for Children with Attention Deficit Hyperactivity Disorder: Effects on academic, social, and behavioral functioning. *International Journal of Disability, Development and Education*, 53(2), 161–176. doi:10.1080/10349120600716141
- Ervin, R. A, DuPaul, G. J., Kern, L., & Friman, P. C. (1998). Classroom-based functional and adjunctive assessments: proactive approaches to intervention selection for adolescents with attention deficit hyperactivity disorder. *Journal of applied behavior analysis*, 31(1), 65–78. doi:10.1901/jaba.1998.3165
- Kos, J. (2008). What Do Teachers Know, Think and Intend To Do About ADHD? Retrieved from

[http://research.acer.edu.au/tll\\_misc/9](http://research.acer.edu.au/tll_misc/9)

- Miranda, A., Presentacion, M. J., & Soriano, M. (2002). Effectiveness of a school-based multicomponent program for the treatment of children with ADHD. *J Learn Disabilities*, 35(6), 546-562.
- Owens, J. S., Holdaway, A. S., Zoromski, A. K., Evans, S. W., Himawan, L. K., Girio-Herrera, E., & Murphy, C. E. (2012). Incremental Benefits of a Daily Report Card Intervention Over Time for Youth With Disruptive Behavior. *Behavior therapy*, 43(4), 848-861. doi: <http://dx.doi.org/10.1016/j.beth.2012.02.002>
- Pinto, A. C. F. (2012). *Qual o efeito dos Jogos Electrónicos e dos Videojogos na Perturbação da Hiperactividade com Défice de Atenção: Percepção dos Docentes do 1º e 2º Ciclo do Ensino Básico* (What is the effect of Electronic Games and Video Games in ADHD: Perception of Teachers from Primary School). (Unpublished master's thesis). Escola Superior de Educação João de Deus. Available at: <http://comum.rcaap.pt/bitstream/123456789/2495/1/AnaPinto.pdf>
- Power, T. J., Mautone, J. A., Soffer, S. L., Clarke, A. T., Marshall, S. A., Sharman, J., . . . Jawad, A. F. (2012). A family-school intervention for children with ADHD: results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 80(4), 611-623. doi: 10.1037/a0028188
- Power, T., Karustis, J. & Habboushe, D. (2001). *Homework Success for Children with ADHD: A FamilySchool Intervention Program*. NY: Guilford Press. Retrieved from [www.nasponline.org/store](http://www.nasponline.org/store)
- Raggi, V. L. and Chronis, A. M. (2006). Interventions to Address the Academic Impairment of Children and Adolescents with ADHD. *Clinical Child and Family Psychology Review*, 9(2), 85-111. DOI: 10.1007/s10567-006-0006-0
- Rogers, M. A., Wiener, J., Marton, I., & Tannock, R. (2009). Parental involvement in children's learning: comparing parents of children with and without Attention-Deficit/Hyperactivity Disorder (ADHD). *J Sch Psychol*, 47(3), 167-185. doi: 10.1016/j.jsp.2009.02.001
- Sheridan, S. M. (1995). *The Tough Kid Social Skills Book* by Sheridan. Sopris West Publisher.
- Webster-Stratton, C., Jamila Reid, M., & Stoolmiller, M. (2008). Preventing conduct problems and improving school readiness: Evaluation of the Incredible Years teacher and child training programs in high-risk schools. *Journal of Child Psychology and Psychiatry*, 49(5), 471-488.

## School context: Support

- 
- National Collaborating Centre for Mental Health (UK). Attention Deficit Hyperactivity Disorder: Diagnosis and Management of ADHD in Children, Young People and Adults. Leicester (UK): British Psychological Society (UK); 2009. (NICE Clinical Guidelines, No. 72.) Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK53652/>
- Geng, G. (2011). Investigation of Teachers' Verbal and Non-verbal Strategies for Managing Attention Deficit Hyperactivity Disorder (ADHD) Students' Behaviors within a Classroom Environment. *Australian Journal of Teacher Education*, 36(7), 17-30. DOI: 10.14221/ajte.2011v36n7.5 Retrieved from <http://ro.ecu.edu.au/ajte/vol36/iss7/2>
- Cooper, P., & Ideus, K. (1996). *Attention Deficit/Hyperactivity Disorder: A Practical Guide for Teachers*. London: David Fulton.
- DuPaul, George J. Jitendra, Asha K. Volpe, Robert J. Lutz, J. Gary Gruber, Rosemary, E. Lorah, Kristi S. & Tresco Katy E. (2004, February). Promoting Academic Success in Students with ADHD: Short-Term Outcomes. Paper presented at the annual Pacific Coast Research Conference, Coronado, CA.
- Fernandes, E. V. (2007). ADHD no âmbito escolar (ADHD in schools). (Unpublished master's thesis). Departamento de Educação da Universidade de Aveiro. Available at: <https://ria.ua.pt/bitstream/10773/4748/1/2007001288.pdf>
- Filipe, M. D. B. (2011). Práticas/estratégias na ADHD (Strategies used in ADHD). (Unpublished master's thesis). Escola Superior de Educação Almeida Garrett. Available at:

- [http://recil.grupolusofona.pt/bitstream/handle/10437/1494/Final\\_%20Di...pdf?sequence=1](http://recil.grupolusofona.pt/bitstream/handle/10437/1494/Final_%20Di...pdf?sequence=1)
- Espada, C. S. (2011). *Atitude dos Professores do 1.º Ciclo face à Inclusão de alunos com PHDA* (Teachers attitudes towards inclusion of students' with ADHD). (Unpublished master's thesis). Escola Superior de Educação Almeida Garrett. Available at:  
<http://recil.grupolusofona.pt/bitstream/handle/10437/1671/Disserta%c3%a7%c3%a3o%20ESEAG%202011%20-%20CI%c3%a1udia%20Espada.pdf?sequence=1>
- Pereira, S., Franco, G., & Ferreira, M. (2009). Necessidades de (In) Formação dos Professores relativamente à PHDA em Contexto Escolar: o Caso do Concelho de Santa Cruz (Teachers' training needs concerning ADHD). *Proceedings of the X Congresso Internacional Galego-Português de Psicopedagogia*. Braga: Universidade do Minho. Available at:  
<http://www.educacion.udc.es/grupos/gipdae/documentos/congreso/Xcongreso/pdfs/t3/t3c79.pdf>
- Barkley, R. A., Shelton, T. L., Crosswait, C., et al. (2000). Multi-method psycho-educational intervention for preschool children with disruptive behavior: preliminary results at post-treatment. *The Journal of Child Psychology and Psychiatry*, 41, 319–332.
- Leal, M. & Dias, P. (2010). Intervention in Learning Difficulties with children with Attention Deficit and Hyperactivity Disorder (ADHD) at Primary School: A North of Portugal Research. *Proceeding of Teaching and Learning 2010: Advances in Teaching and Learning Research*, Sevilha: IASK – International Association for the Scientific Knowledge.
- Sanches-Ferreira, M., Lopes-dos-Santos, P., Alves, S., & Ferreira-Alves, C. (2012, September). Improving the Use of International Classification of Functioning, Disability and Health to Document Holistic Functioning Profiles: a Teacher Training Program. Paper presented at ECER 2012 – the European Conference on Educational Research, Cádiz. Abstract retrieved from <http://www.ea-ecer.de/ecerprogrammes/conference/6/contribution/17599/>
- Purdie, N., Hattie, J. & Carroll, A. (2002). A review of the research on interventions for attention deficit hyperactivity disorder: what works best? *Review of Educational Research*, 72, 61–99.
- Reid, R., Vasa, S. F., Maag, J. W., & Wright, R. (1994). An analysis of teachers' perceptions of attention deficit hyperactivity disorder. *The Journal of Research and Development in Education*, 27, 196–202.
- Sciutto, M.J, Terjesen, M.D. & Bender Frank, A.S. (2000). Teachers' Knowledge and Misperceptions of Attention-Deficit/Hyperactivity Disorder. *Psychology in the Schools*, 37, 115-122.
- Greene, R., Abidin, R., & Kmetz, C. (1997). The index of teaching stress: A measure of student–teacher compatibility. *Journal of School Psychology*, 35, 239–259.
- Greene, R.W., Marchant, C., & Beszterczey, S. (1997). *The student-teacher tension checklist*. Unpublished manuscript.
- Kotkin, R. A. (1995). The Irvine Paraprofessional Program: Using paraprofessionals in serving students with ADHD. *Intervention in School and Clinic*, 30, 235-240.
- Miranda, A., Presentación, M. J., and Soriano M. (2002). Effectiveness of a School-Based Multicomponent Program for the Treatment of Children with ADHD. *Journal of Learning Disabilities*, 35 (6), 547–563. doi: 10.1177/00222194020350060601
- Ostberg, M., Rydell, A -M. (2012). An efficacy study of a combined parent and teacher management training programme for children with ADHD. *Nord J Psychiatry*, 66, 123–130.

## Family context

- 
- Abreu-Lima, I., Alarcão, M., Almeida, A. T., Brandão, M. T., Cruz, O., Gaspar, M. F. & Santos, M. R. (2010). *Avaliação de Intervensões de Educação Parental: relatório* (Evaluation of Parent Training Interventions: a report). Retrieved from:  
<http://repositorioaberto.up.pt/bitstream/10216/62362/2/77649.PDF>
- Arnold, E., O'Leary, S. G., Wolff, L. S. & Acker, M. M., (1993). The Parenting Scale: A measure of dysfunctional parenting in discipline situations, *Psychological Assessment*, 5(2)137-144.

- Azevedo, A. L. (2011). *Programa de Intervenção: Perturbação de Hiperatividade e Défice de Atenção (PHDA) em Adultos* (Intervention Program: Attention Deficit Hyperactivity Disorder (ADHD) in Adulthood). (Unpublished master's thesis). Universidade da Beira Interior.
- Bailham, D., & Harper, P. (2004). Attachment theory and mental health. In K. Dwivedi & P. Harper (Eds.), *Promoting the emotional well-being of children and adolescents and preventing their mental ill health* (pp. 49- 68). London: Jessica Kingsley Publishers.
- Barkley, R.A. (2006). *Attention-Deficit Hyperactivity Disorder Third Edition. A handbook for diagnosis and treatment*. The Guildford Press New York London.
- Barkley, R.A. (2013). *ADHD in Children: Diagnosis and Assessment*. Retrieved from <http://www.continuingeducation.net/active/courses/course004.php>
- Benedetto, L. and Fazzari, E. (2010). Similarità del parenting e benessere in età prescolare: quanto è importante la coerenza educativa tra i genitori? *Psicologia dell'educazione*, 4(3), 295-312. Trento, Erickson.
- Biederman, J., Newcorn, J., Sprich, S. (1991). Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders. *Am J Psychiatry*, 148, 564–577.
- Bor, W., Sanders, M.R., & Markie-Dadds, C. (2002). The effects of the Triple P-Positive Parenting Program on preschool children with co-occurring disruptive behavior and attentional/hyperactive difficulties. *Journal of abnormal child psychology*, 30(6), 571-587. doi: 10.1023/a:1020807613155
- Bradley, S.J., Jadaa, D.A., Brody, J., Landy, S., Tallett, S.E., Watson, W., . . . Stephens, D. (2003). Brief psychoeducational parenting program: An evaluation and 1-year follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42(10), 1171-1178.
- Brown, K. W., Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84, 822–848. doi: 10.1037/00223514.84.4.822
- Chronis, A.M., Chacko, A., Fabiano, G.A., Wymbs, B.T., & Pelham, Jr, W.E. (2004). Enhancements to the behavioral parent training paradigm for families of children with ADHD: review and future directions. *Clinical child and family psychology review*, 7(1), 1–27.
- Chronis, A.M., Lahey, B.B., Pelham, Jr, W.E., Williams, S.H., Baumann, B.L., Kipp, H., . . . Rathouz, P.J. (2007). Maternal depression and early positive parenting predict future conduct problems in young children with attention-deficit/hyperactivity disorder. *Developmental Psychology*, 43(1), 70-82.
- Chronis, A.M., Lahey, B.B., Pelham, W.E., Kipp, H.L., Baumann, B.L., & Lee, S.S. (2003). Psychopathology and substance abuse in parents of young children with attention-deficit/hyperactivity disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 42, 1424–1432.
- Coghill, D., Soutullo, C., D'Aubuisson, C., Preuss, U., Lindback, T., Silverberg, M., & Buitelaar, J. (2008). Impact of attention-deficit/hyperactivity disorder on the patient and family: results from a European survey. *Child Adolesc Psychiatry Ment Health*, 2(1), 31. doi: 10.1186/1753-2000-2-31
- Coughlin, M., Sharry, J., Fitzpatrick, C., Guerin, S., & Drumm, M. (2009). A controlled clinical evaluation of the Parents Plus Children's Programme: A video-based programme for parents of children aged 6 to 11 with behavioural and developmental problems. *Clinical Child Psychology and Psychiatry*, 14(4), 541- 558.
- Coutinho, M. (2004). Apoio à família e formação parental. *Análise Psicológica*, 1(XXII), 55-64.
- Cunningham, C.E. (2006). COPE: Large-group, community-based, family-centered parent training. In R.A. Barkley (Ed.), *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (pp. 480–98). New York: Guilford Press.
- Daley, D., & O'Brien, M. (2013). A small-scale randomized controlled trial of the self-help version of the New Forest Parent Training Programme for children with ADHD symptoms. *European Child and Adolescent Psychiatry*. doi: 10.1007/s00787-013-0396-8
- DuPaul, G. J., McGoey, K. E., Eckert, T. L., & VanBrakle, J. (2001). Preschool children with attentiondeficit/hyperactivity disorder: impairments in behavioral, social, and school functioning. *Journal of the American Academy of Child & Adolescent Psychiatry*.

- Eyberg, S. M., & Pincus, D. (1999). *Eyberg Child Behavior Inventory and Sutter-Eyberg Student Behavior Inventory—Revised: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Foley, M. (2011). A comparison of family adversity and family dysfunction in families of children with attention deficit hyperactivity disorder (ADHD) and families of children without ADHD. *Journal for specialists in pediatric nursing: JSPN*, 16(1), 39–49. doi:10.1111/j.1744-6155.2010.00269.x
- Frankel, F., & Myatt, R. (1997). Parent-assisted transfer of children's social skills training: effects on children with and without attention-deficit hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*. Retrieved from <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Parent+Assisted+Transfer+of+Children's+Social+Skills+Training:+Effects+on+Children+With+and+Without+Attention+Deficit+Hyperactivity+Disorder#0>
- Gable, S., Crnic, K. and Belsky, J. (1994). Co-parenting within the Family System. *Family Relations*, 43(4), 380-386.
- Garstein, M. A., & Fagot, B. I. (2003). Parental depression, parenting and family adjustment, and child effortful control: Explaining externalizing behaviors for preschool children. *Journal of applied Developmental Psychology*, 24, 143-177.
- Griffin, C., Guerin, S., Sharry, J., & Drumm, M. (2010). A multi-centre controlled study of an early intervention parenting programme for young children with behavioural and developmental difficulties. *International Journal of Clinical and Health Psychology*, 10(2), 279 – 294.
- Hand, A. McDonnell, E., Honari, B., & Sharry, J. (2013). A community led approach to delivery of the parents plus children's programme for the parents of children aged 6-11. *International Journal of Clinical and Health Psychology*, 13, 81-90.
- Harvey, E. A. (2000). Parenting Similarity and Children with Attention – Deficit/Hyperactivity Disorder. *Child & Family Behaviour Therapy*, 33, 39-54.
- Hoath, F. E., & Sanders, M. R. (2002). A feasibility study of Enhanced Group Triple P-Positive parenting program for parents of children with attention-deficit/hyperactivity disorder. *Behaviour Change*, 19(4), 191-206. doi: 10.1375/behc.19.4.191
- Ispa, J. M., Fine, M. A., Halgunseth, L. C., Harper, S., Robinson, J., Boyce, L., ... Brady-Smith, C. (2004). Maternal intrusiveness, maternal warmth, and mother-toddler relationship outcomes: variations across low-income ethnic and acculturation groups. *Child development*, 75(6), 1613–1631. doi:10.1111/j.1467-8624.2004.00806.x
- Johnston, C. & Jassy, J.S. (2007). Attention-Deficit/Hyperactivity Disorder and Oppositional/Conduct Problems: Links to Parent-Child Interactions. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 16(2), 74-79.
- Johnston, C., & Mash, E. J. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology*, 18(2), 167-175.
- Johnston, C., Mash, E. J., Miller, N., & Ninowski, J. E. (2012). Parenting in adults with attentiondeficit/hyperactivity disorder (ADHD). *Clinical Psychology Review*, 32(4), 215-228. doi: 10.1016/j.cpr.2012.01.007
- Jones, K., Daley, D., Hutchings, J., Bywater, T., & Eames, C. (2007). Efficacy of the Incredible Years Basic parent training programme as an early intervention for children with conduct problems and ADHD. *Child Care Health and Development*, 33(6), 749-756. doi: 10.1111/j.1365-2214.2007.00747.x
- Kashdan, T. B., Jacob, R. G., Pelham, W. E., Lang, A. R., Hoza, B., Blumenthal, J. D., & Gnagy, E. M. (2004). Depression and Anxiety in Parents of Children With ADHD and Varying Levels of Oppositional Defiant behaviors: Modeling Relationships With Family Functioning. *Journal of Clinical Child and Adolescent Psychology*, 33(1), 169–181. Available at <http://psychfaculty.gmu.edu/kashdan/publications/parentanxiety.pdf>

- Keown, L. J. (2012). Predictors of Boys' ADHD Symptoms from Early to Middle Childhood: The Role of Father-Child and Mother-Child Interactions. *Journal of abnormal child psychology*, 40(4), 569-581. doi: 10.1007/s10802-011-9586-3
- Klassen, A. F., Miller, A., & Fine, S. (2004). Health-related quality of life in children and adolescents who have a diagnosis of attention-deficit/hyperactivity disorder. *Pediatrics*, 114(5), 541-547. doi:10.1542/peds.2004-0844
- Landry, S. H., Smith, K. E., & Swank, P. R. (2006). Responsive parenting: establishing early foundations for social, communication, and independent problem-solving skills. *Developmental psychology*, 42(4), 627-642. doi:10.1037/0012-1649.42.4.627
- Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review*, 20(5), 561-592.
- Martinez, C. R., Jr, & Forgatch, M. S. (2001). Preventing problems with boys' noncompliance: effects of a parent training intervention for divorcing mothers. *Journal of consulting and clinical psychology*, 69(3), 416-428.
- Marujo, H. A. (2002). Treino de pais: Formas científicas de educar para a felicidade. *Revista do Instituto de Acção Social*, 11, 8-11.
- Marzocchi, G. M. (2011). La presa in carico dei bambini con ADHD e DSA. Costruzione della rete tra clinici, genitori e insegnanti. Trento, Erickson.
- McHale, J., Kuersten-Hogan, R., Lauretti, A. & Talbot, J. (2001). Coparenting. In L. Balter (Ed.), *Parenthood in America: An Encyclopedia*. New York: ABC-CLIO.
- Moreira, M. S. (2010). Stress e suporte social em pais de crianças com ADHD (Stress and social support from parents of children with ADHD). (Unpublished master's thesis). Universidade Fernando Pessoa. Available at: <http://bdigital.ufp.pt/bitstream/10284/1418/2/DISSERTA%C3%87%C3%83O.pdf>
- Pelham, W. E., Wheeler, T., Chronis, A. (1998). Empirically supported psychosocial treatments for ADHD. *Journal of Clinical Child Psychology*, 27, 190-205.
- Phelan, T. W. (2010). *1-2-3 Magic* 4 Ed. ParentMagic, Inc. Glen Ellyn Illinois.
- Raggi, V. L., Chronis-Tuscano, A., Fishbein, H., & Groomes, A. (2009). Development of a brief, behavioral homework intervention for middle school students with attention-deficit/hyperactivity disorder. *School Mental Health*, 1(2), 61-77.
- Reid, M.J., & Webster-Stratton, C. (2001). The incredible years parent, teacher, and child intervention: Targeting multiple areas of risk for a young child with pervasive conduct problems using a flexible, manualized treatment program. *Cognitive and Behavioral Practice*, 8(4), 377-386. doi: 10.1016/s1077-7229(01)80011-0
- Rinaldi, R., & Chifari, A. (2011). Sperimentazione di un nuovo protocollo di Parent Training avanzato. *Proceedings of VIII Congresso Nazionale AIDAI*, Pescara, September 16-17, 2011.
- Sanders, M. R. (1999). Triple P-Positive Parenting Program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical child and family psychology review*, 2(2), 71-90.
- Sanders, M. R., Markie-Dadds, C., Tully, L. A., & Bor, W. (2000). The Triple-P Positive Parenting Program: A comparison of enhanced, standard and self-directed behavioural family intervention for parents of children with early onset conduct problems. *Journal of Consulting and Clinical Psychology*, 68, 624-640.
- Santos, V.A.B. (2008). Stress Parental e Práticas Parentais em Mães de Crianças com ADHD (Parental Stress and practices in Mothers of Children with ADHD). (Unpublished master's thesis). Faculdade de Psicologia e de Ciências de Educação da Universidade de Lisboa. Available at: [http://repositorio.ul.pt/bitstream/10451/695/1/17675\\_Dissertacao\\_Mestr\\_Integ\\_Psic\\_Vanessa\\_Santos.pdf](http://repositorio.ul.pt/bitstream/10451/695/1/17675_Dissertacao_Mestr_Integ_Psic_Vanessa_Santos.pdf)
- Shaffer, D., Gould, M. S., Brasic, J., Ambrosini, P., Fisher, P., Bird, H., Aluwahlia, S., et al. (1983). A Children's Global Assessment Scale (CGAS). *Archives of General Psychiatry*, 40, 1228-1231.

- Sharry, J., & Fitzpatrick, C. (2008). *Parents Plus Children's Programme: A video-based parenting guide to managing behaviour problems and promoting learning and confidence in children aged 6-11*. Dublin: Parents Plus.
- Sharry, J., & Fitzpatrick, C. (2009). *Parents Plus Adolescents Programme: A DVD based parenting course on managing conflict and getting on better with older children and teenagers aged 11-16 years*. Dublin (2nd Edition): Parents Plus.
- Sharry, J., Hampson, G., and Fanning, M. (2009). *Parents Plus Early Years Programme: A DVD-based parenting course on promoting development and managing behaviour problems in young children aged 1-6*. Dublin (2nd Edition): Parents Plus.
- Sonuga-Barke, E. J. J., Daley, D., Thompson, M., Laver-Bradbury, C., & Weeks, A. (2001). Parent-based therapies for preschool attention-deficit/hyperactivity disorder: A randomized, controlled trial with a community sample. *Journal of American Academy of Child and Adolescent Psychiatry*, 40, 402–408.
- Sonuga-Barke, E. J. S., Thompson, M., Daley, D., & Laver-Bradbury, C. (2004). Parent training for Attention Deficit/Hyperactivity Disorder: Is it as effective when delivered as routine rather than as specialist care? *British Journal of Clinical Psychology*, 43, 449 – 457.
- Sung, V., Hiscock, H., Sciberras, E., & Efron, D. (2008). Sleep problems in children with attentiondeficit/hyperactivity disorder: prevalence and the effect on the child and family. *Archives of pediatrics & adolescent medicine*, 162(4), 336.
- Thompson, M. J. J., Laver-Bradbury, C., Ayres, M., Le Poidevin, E., Mead, S., Dodds, C., . . . Weeks, A. (2009). A small-scale randomized controlled trial of the revised new forest parenting programme for preschoolers with attention deficit hyperactivity disorder. *European child & adolescent psychiatry*, 18(10), 605-616.
- van der Oord, S., Bögels, S. M., & Peijnenburg, D. (2012). The Effectiveness of Mindfulness Training for Children with ADHD and Mindful Parenting for their Parents. *Journal of Child and Family Studies*, 21(1), 139-147. doi: 10.1007/s10826-011-9457-0
- Vigilante, V. A., & Wahler, R. G. (2005). Covariations between mothers' responsiveness and their use of “do” and “don't” instructions: Implications for child behavior therapy. *Behavior therapy*, 36(3), 207-212.
- Vio, C., Marzocchi, G. M., & Offredi, F. (1999). *Il bambino con deficit di attenzione/iperattività*. Trento, Erickson.
- Wagner, S. M., & McNeil, C. B. (2008). Parent-Child Interaction Therapy for ADHD: A Conceptual Overview and Critical Literature Review. *Child & Family Behavior Therapy*, 30(3), 231–256. doi:10.1080/07317100802275546
- Wakschlag, L. S., & Hans, S. L. (1999). Relation of maternal responsiveness during infancy to the development of behavior problems in high-risk youths. *Developmental psychology*, 35(2), 569–579.
- Webster-Stratton, C. H. (1996). Early intervention with videotape modeling: Programs for families of children with Oppositional Defiant Disorder or Conduct Disorder. In E. D. Hibbs & P. S. Jensen (Eds.), *Psychosocial treatments for child and adolescent disorders: Empirically based strategies for clinical practice* (pp. 377-408). Washington, DC: American Psychological Association
- Webster-Stratton, C.H., Reid, M.J., & Beauchaine, T. (2011). Combining Parent and Child Training for Young Children with ADHD. *Journal of Clinical Child and Adolescent Psychology*, 40(2), 191-203. doi: 10.1080/15374416.2011.546044
- Wells, K. C., Pelham, W. E., Kotkin, R. A., Hoza, B., Abikoff, H. B., Abramowitz, A., ... Schiller, E. (2000). Psychosocial treatment strategies in the MTA study: rationale, methods, and critical issues in design and implementation. *Journal of Abnormal Child Psychology*, 28(6), 483–505.
- Zeanah, C. H., Jr., Larrieu, J. A., Heller, S. S., & Valliere, J. (2000). Infant–parent relationship assessment. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 485–493). New York: Guilford Press.



## Peers context

- Abikoff, H. B., Jensen, P. S., Arnold, E. L. L., et al. (2002). Observed classroom behavior of children with ADHD: relationship to gender and comorbidity. *J Abnorm Child Psychol*, 30, 349–359.
- Abikoff, H., Hechtman, L., Klein, R. G., Gallagher, R., Fleiss, K., Etcovitch, J., Cousins, L., et al. (2004). Social functioning in children with ADHD treated with long-term methylphenidate and multimodal psychosocial treatment. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43(7), 820–829. doi:10.1097/01.chi.0000128797.91601.1a
- Antshel, K. M., & Remer, R. (2010). Social Skills Training in Children With Attention Deficit Hyperactivity Disorder : A Randomized-Controlled Clinical Trial Social Skills Training in Children With Attention Deficit Hyperactivity Disorder: A Randomized-Controlled Clinical Trial. *Journal of Clinical Child & Adolescent Psychology*, 32(1), 153–165. doi: http://dx.doi.org/10.1207/S15374424JCCP3201\_14
- Avila, F. & Simas, C. (2012). *Socialização/Interação entre Pares de Alunos com Síndrome de Asperger, em Contexto Escolar* (Socialization/Interaction between Peers of Students with Asperger Syndrome, in Educational Context). (Unpublished master's thesis). Universidade Fernando Pessoa.
- Azevedo, A. L. (2011). *Programa de Intervenção: Perturbação de Hiperactividade e Défice de Atenção (PHDA) em Adultos* (Intervention Program: Attention Deficit Hyperactivity Disorder (ADHD) in Adulthood). (Unpublished master's thesis). Universidade da Beira Interior.
- Bagwell, C. L., Schmidt, M. E., Newcomb, A. F., et al. (2001). Friendship and peer rejection as predictor of adult adjustment. In D. W. Nangle & C. A. Erdley (Eds.), *New directions for child development: No. 91. The role of friendship in psychological adjustment* (pp. 25–50). San Francisco, CA: Jossey-Bass.
- Bierman, K. L. (2004). *Peer Rejection: Developmental Processes and Intervention Strategies*. New York: Guilford Press.
- Blachman, D. R., & Hinshaw, S. P. (2002). Patterns of friendship among girls with and without attentiondeficit/hyperactivity disorder. *Journal of abnormal child psychology*, 30(6), 625-640.
- Campino, S. (2012). *Avaliação do Processo de Implementação de um Programa de Promoção de Competências Socio-emocionais na Transição do pré-escolar para o 1º ano de Escolaridade* (Evaluation of an intervention program to promote socio-emotional skills on the transition between pre-school and the 1<sup>st</sup> grade). (Unpublished master's thesis). Faculdade de Psicologia da Universidade de Lisboa.
- Di Pietro, M., Bassi, E., Filoramo, G. (2001). *L'alunno iperattivo in classe*. Trento, Erickson.
- Doyle, B. B. (2006). *Understanding and Treating Adults with Attention Deficit Hyperactivity Disorder*. Washington: American Psychiatric Publishing.
- DuPaul, G. J., & Eckert, T. L. (1998). Academic Interventions for students with Attention-Deficit/Hyperactivity disorder: a review of the literature. *Reading & Writing Quarterly: Overcoming Learning Difficulties*, 14 (1), 59–82.
- DuPaul, G. J., & Henningson, P. N. (1993). Peer tutoring effects on the classroom performance of children with Attention Deficit Hyperactivity Disorder. *School Psychology Review*, 22(1), 134–143.
- Enright, R. D., & Fitzgibbons, R. P. (2000). *Helping clients forgive: An empirical guide for resolving anger and restoring hope*. Washington, DC: American Psychological Association.
- Erdley, C. A., Nangle, D. W., Newman, J. E., & Carpenter, E. M. (2001). Children's friendship experiences and psychological adjustment: Theory and research. In D. W. Nangle & C. A. Erdley (Eds.), *New directions for child development: No. 91. The role of friendship in psychological adjustment* (pp. 5–23). San Francisco, CA: Jossey-Bass.
- Frankel, F. & Feinberg, D. (2002). Social problems associated with ADHD vs. ODD in children referred for friendship problems. *Child Psychiatry and Human Development*, 33, 125-146.
- Frankel, F., & Myatt, R. (1997). Parent-assisted transfer of children's social skills training: effects on children with and without attention-deficit hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*. Retrieved from

<http://www.sciencedirect.com/science/article/pii/S0890856709626149>

- Greene, R. W., Biederman, J., Faraone, S. V., et al. (2001). Social impairment in girls with ADHD: patterns, gender comparisons, and correlates. *J Am Acad Child Adolesc Psychiatry*, 40, 704–710.
- Greenwood, C. R., (1997). ClassWide Peer Tutoring. *Behavior and Social Issues*, 7(1), 53-57.
- Gresham, F. M., MacMillan, D. L., Bocian, K. M., Ward, S. L., & Forness, S. R. (1998). Comorbidity of hyperactivity-impulsivity- inattention and conduct problems: Risk factors in social, affective, and academic domains. *Journal of Abnormal Child Psychology*, 26, 393–406.
- Hinshaw, S. P., & Melnick, S. M. (1995). Peer relationships in boys with attention-deficit hyperactivity disorder with and without comorbid aggression. *Development and Psychopathology*, 7(04), 627-647.
- Hoza, B. (2007). Peer Functioning in Children With ADHD. *Journal of Pediatric Psychology*, 32(6), 655–663. doi:10.1093/jpepsy/jsm024
- Hoza, B., Gerdes, A. C., Mrug, S., Hinshaw, S. P., Bukowski, W. M., Gold, J. A., . . . Elliott, G. R. (2005). Peer-assessed outcomes in the multimodal treatment study of children with attention deficit hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology*, 34(1), 74-86.
- Hoza, B., Mrug, S., Gerdes, A. C., et al. (2005). What aspects of peer relationships are impaired in children with attention-deficit/hyperactivity disorder? *J Consult Clin Psychol*, 73, 411–423.
- Hupp, S. D. A., & Reitman, D. (1999). Improving sports skills and sportsmanship in children diagnosed with Attention-Deficit/Hyperactivity Disorder. *Child & Family Behavior Therapy*, 21(3), 35-51. doi: 10.1300/J019v21n03\_03
- Joyce-Moniz, L. (1997). *Psicologia do desenvolvimento do adolescente e do adulto* [Developmental psychology from the adolescent and the adult]. Coimbra: McGraw-Hill.
- Kats-Gold, I., Besser, A., & Priel, B. (2007). The role of simple emotion recognition skills among school aged boys at risk of ADHD. *J Abnorm Child Psychol*, 35(3), 363-378. doi: 10.1007/s10802-006-9096x
- Kirby, E., Grimley, L. (1989). *Disturbi dell'attenzione e iperattività* (original edition 1986). Trento, Erickson.
- Lochman, J. E., Wells, K., & Lenhart, L. A. (2008). *Coping Power. Programma per il controllo della rabbia e aggressività in bambini e adolescenti*. Edizione italiana a cura di P. Muratori, L. Polidori, L. Ruglioni, A. Manfredi, A. Milone. Trento, Erickson.
- Marshall, M. P., Molina, B. S. G., & Pelham, W. E. (2003). Childhood ADHD and adolescent substance use: An examination of deviant peer group affiliation as a risk factor. *Psychology of Addictive Behaviors*, 17, 293–302.
- Martins, M. (2012). *À Descoberta: um programa de promoção de competências sociais e emocionais* (Discovering: promoting social and emotional skills). (Unpublished master's thesis). Universidade dos Açores.
- McQuade, J. D., & Hoza, B. (2008). Peer problems in Attention Deficit Hyperactivity Disorder: current status and future directions. *Developmental disabilities research reviews*, 14(4), 320–4. doi:10.1002/ddrr.35
- Meichenbaum, D. (1969). The effects of instructions and reinforcement on thinking and language behaviors of schizophrenics. *Behaviour Research and Therapy*, 7, 101-114.
- Mikami, A. Y. (2010a). The importance of friendship for youth with attention-deficit/hyperactivity disorder. *Clinical child and family psychology review*, 13(2), 181–98. doi:10.1007/s10567-010-0067-y
- Mikami, A. Y., Griggs, M. S., Lerner, M. D., Emeh, C. C., Reuland, M. M., Jack, A., & Anthony, M. R. (2013). A randomized trial of a classroom intervention to increase peers' social inclusion of children with attention-deficit/hyperactivity disorder. *J Consult Clin Psychol*, 81(1), 100-112. doi: 10.1037/a0029654
- Mikami, A. Y., Huang-Pollock, C. L., Pfiffner, L. J., McBurnett, K., & Hangai, D. (2007). Social skills differences among attention-deficit/hyperactivity disorder types in a chat room assessment task. *J Abnorm Child Psychol*, 35(4), 509-521. doi: 10.1007/s10802-007-9108-5
- Mikami, A. Y., Jack, A., Emeh, C. C., & Stephens, H. F. (2010b). Parental Influence on Children with Attention-Deficit/Hyperactivity Disorder: I. Relationships Between Parent Behaviors and Child Peer Status. *Journal of abnormal child psychology*, 38(6), 721-736. doi: 10.1007/s10802-010-9393-2

- O'Callaghan, P. M., Reitman, D., Northup, J., Hupp, S. D., & Murphy, M. A. (2003). Promoting social skills generalization with ADHD-diagnosed children in a sports setting. *Behavior therapy*, 34(3), 313-330.
- Pelham, W. E., & Bender, M. E. (1982). Peer relationships in hyperactive children: description and treatment. In: K. D. Gadow, & I. Bialer (Eds.). *Advances in Learning and Behavioral Disabilities*, 1, 365-436. Greenwich, Conn: JAI Press.
- Pfiffner, L. J., & McBurnett, K. (1997). Social skills training with parent generalization: treatment effects for children with attention deficit disorder. *J Consult Clin Psychol*, 65(5), 749-757.
- Pfiffner, L. J., Yee Mikami, A., Huang-Pollock, C., Easterlin, B., Zalecki, C., & McBurnett, K. (2007). A randomized, controlled trial of integrated home-school behavioral treatment for ADHD, predominantly inattentive type. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46(8), 1041-50. doi:10.1097/chi.0b013e318064675f
- Plumer, P. J. & Stoner, G. (2005). The relative effects of classroom peer tutoring and peer coaching on the positive social behaviors of children with ADHD. *Journal of Attention Disorders*, 9(1), 290-300.
- Solanto, M. V., Pope-Boyd, S. A., Tryon, W. W., & Stepak, B. (2009). Social functioning in predominantly inattentive and combined subtypes of children with ADHD. *J Atten Disord*, 13(1), 27-35. doi: 10.1177/1087054708320403
- Storebo, O. J., Gluud, C., Winkel, P., & Simonsen, E. (2012). Social-skills and parental training plus standard treatment versus standard treatment for children with ADHD--the randomised SOSTRA trial. *PLoS One*, 7(6), e37280-e37280. doi: 10.1371/journal.pone.0037280
- Tomé, J. M. (2011). Grupo de pares, comportamentos de risco e a saúde dos adolescentes portugueses (Group of peers, risk behaviors and the health of Portuguese youths). (Unpublished master's thesis). Faculdade de Motricidade Humana da Universidade de Lisboa.
- Tutty, S., Gephart, H., & Wurzbacher, K. (2003). Enhancing behavioral and social skill functioning in children newly diagnosed with attention-deficit hyperactivity disorder in a pediatric setting. *Journal of developmental and behavioral pediatrics: JDBP*, 24(1), 51-7. Available at <http://www.ncbi.nlm.nih.gov/pubmed/12584485>
- Ventura, L. (2011). Efeitos do Programa REagir nas Variáveis Atenção e Comportamento em Crianças do 1º Ciclo com Problemas de Comportamento em Contexto Escolar (The impact of the REagir Program on attention and behavior variables of 1<sup>st</sup> grade children with behavioral problems). (Unpublished master's thesis). Faculdade de Motricidade Humana da Universidade de Lisboa.
- Weyandt, L. L., DuPaul, G. (2006). ADHD in College Students. *Journal of Attention Disorders*, 10 (1), 9-19. doi: 10.1177/1087054705286061.
- Zalecki, C. A., Hinshaw, S. P. (2004). Overt and relational aggression in girls with attention deficit hyperactivity disorder. *J Clin Child Ado-lesc Psychol*, 33,125-137.

## ICT based tools for ADHD

- 
- Angello, L. M., Volpe, R. J., Di Perna, J. C., Gureasko-Moore, S. P., Gureasko-Moore, D. P., Nebrig, M. R., & Ota (2003). Assessment of attention-deficit/hyperactivity disorder: An evaluation of six published rating scales. *School Psychology Review*, 32(2), 241-262.
- Barkley, R. A. (1994). Can neuropsychological tests help diagnose ADHD? *ADHD Report*, 2(1), 1-3.
- Barkley, R. A. (2007). Unifying theory of ADHD. *Psychological Bulletin*, 121.
- Mann, C. A., Lubar, J. F., Zimmerman, A. W., Miller, C. A. & Muenchen, R. A. (1992). Quantitative analysis of EEG in boys with Attention Deficit Hyperactivity Disorder: Controlled study with clinical implications. *Pediatric Neurology*, 8, 30-36.
- Weiss, M. D. & Weiss, J. R. (2004). A Guide to the Treatment of Adults With ADHD, *J Clin Psychiatry*, 65(3), 27-37.

## **The WHAAM application design and development process**

---

Cohn, M. (2004). User stories applied: For agile software development. Addison-Wesley Professional.



**ITD, Italy**

Consiglio Nazionale delle Ricerche  
Istituto per le Tecnologie Didattiche of Palermo



**CEDAP, Italy**

Centro per i disturbi dell'apprendimento



**AUTH, Greece**

Aristotle University of Thessaloniki



**TCD, Ireland**

Trinity College Dublin



**UAEI, Portugal**

Unit of Support of the Inclusive School  
School of Education of the Polytechnic  
of Porto Institute



**ADDISS, United Kingdom**

National Attention Deficit Disorder Information  
and Support Service

Contact: Antonella Chifari  
Istituto per le Tecnologie Didattiche  
Consiglio Nazionale delle Ricerche  
Via Ugo La Malfa, 153 – 90146  
Palermo (Italy)  
Tel. +39 091 6809215  
antonella.chifari@itd.cnr.it