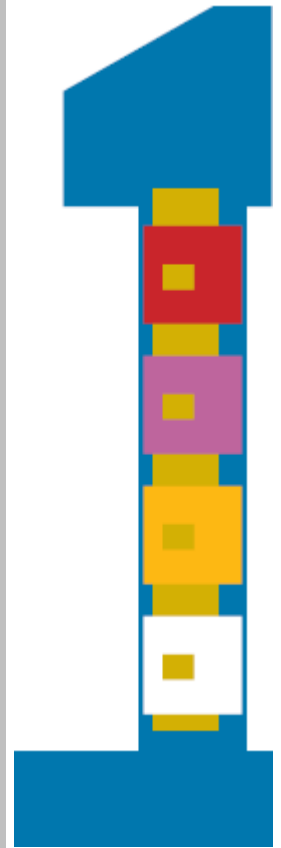


Integral Cognitive Activation Program for Dementias (ICAPD)

Centro de Referencia Estatal de Atención a Personas
con Enfermedad de Alzheimer y otras Demencias



Grupo de investigación
Neuropsicología Cognitiva
(Universidad Salamanca)



INTEGRAL COGNITIVE ACTIVATION PROGRAM FOR DEMENTIAS
(ICAPD)

DIRECTION AND ORGANISATION

Área de Investigación del Centro de Referencia Estatal de Atención a Personas con Enfermedad de Alzheimer y otras Demencias del IMSERSO en Salamanca

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1ª edición, 2011:

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ORIGINAL EDITING:

Ministerio de Sanidad, Política Social e Igualdad.
Secretaría General de Política Social y Consumo.
Instituto de Mayores y Servicios Sociales (IMSERSO)
Avda. de la Ilustración, s/n.con vuelta Ginzo de Limia 58 – 28029 Madrid
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<http://www.imserso.es>

NIPO: 866-11-023-1



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1. ¿Why is it important to intervene neurocognitively while treating dementias?

Dementias in general, and Alzheimer's disease (AD) specifically, are defined as an irreversible neuro-degenerative disorder that causes global permanent impairment, and with consequences as variations in character, cognition, behavior and personality.

It usually begins with very subtle symptoms, stealthy but progressive, as slight memory and language problems during everyday life. Specifically, among others, semantic memory lapses, oversight of completed or planned actions, information repetition a couple of minutes after having already said it, visual-spatial memory problems..., and to which other disorders start to join in: problems in problem-solving planning, motivational problems to manage the behavior towards its end, emotional management problems, etcetera. As in other related dementias (vasculars, frontals, Levy's by bodies disease...), these affectations usually drift to a decline when performing effectively everyday tasks and to the patient stepping into a dependency situation, winding up institutionalized or becoming a considerable weight to his family and caregivers. It always ends with the complete loss of the patient's biography and personal identity.

The most difficult part of this process is to determine the degree of decline during its half-way point. The progression of the disease is heterogeneous. In some people, the evolution of the deterioration process speeds up faster in some abilities while staying relatively normal in others. This progression is determined by the anomalies in the neuronal circuits in which the neurological damage becomes more recognizable. For instance, the typical initial progression of the impairment on the entorhinal cortex, the paralimbic structure of the temporal lobe's earlobe and, subsequently, the hippocampus, usually goads short-term memory problems. Consequently, the loss of this ability becomes more relevant than of others: the memory circuits are the most vulnerable on the AD's pathology, and, therefore, the first ones affected by it.



This way, a lot of times "dementia" is identified as "memory loss". Other patients, however, suffer more damage on processes that involve handling objects, or have language problems due to temporal lobe damage that have a worse clinical prognosis, or different perceptive problems (visual, auditory, olfactory...) as well as the parietal-occipital bone damage. Even if in all cases the affectations end up coinciding on a generalized decline.

This way, dementias are a physical neurological disease, but its main consequence is a broad variety of psychic, cognitive and behavioral problems. In fact, intervening on these patients, both pharmacologically and psychologically, have as its main goal to contain these symptoms that directly affect the quality of life of the patients. This special relationship between the neurological processes and the symptoms that the patient shows gives a special relevance to the relationship between the patient's evaluation and the intervention programs that are being developed alongside.

If the disease is heterogeneous and there aren't two equal patients -specially during the first stages of the disease-, the evaluation processes and the resulting interventions planned with these patients musn't be as well. And any kind of intervention must be flexible to adapt to the specific characteristics of the patient.

This flexibility and heterogeneousness therefore demands the responsible of the intervention to be prepared -on top of that to make the proper neurocognitive evaluation and to determine the cognitive and behavioural abilities that have suffered the



Figura 1. Aspectos fundamentales en la relación entre evaluación e intervención.

most damage on dementia patients. Proper neurocognitive evaluation implies using the appropriate cognitive tests to measure specific abilities. It doesn't imply to make a neuropsychological evaluation with diagnostic ends, but to develop



the most adequate intervention for the patient with dementia. For example: if a patient suffers motivational problems because of a severe deficiency of cerebral or arousal activation to face the demands of daily life, oftentimes tedious activity programs will do nothing. It'll be necessary and essential a cerebral, and therefore cognitive, activation program, that allows to increase the arousal level to the necessary level the development of a cognitive program. Another example of the importance of the neuro-cognitive evaluation is to control the psychological variables that affect the intervention development. Anxiety control, emotional disorder control (depression, melancholy, apathy or agitation), will determine part of the components of the intervention program (relaxation programs, activation, aerobic exercise, exercises with a clear motivational goal, etcetera). Finally, the evaluation must take into account the functional and social aspects of the patient. Immediate family, or caregivers in some cases, are best equipped to determine which are the most damaged functional aspects, or the ones with the most relevance for a proper maintenance of the patient's quality of life.

1.1 Neurocognitive intervention in dementias.

Neurology, the medical area traditionally dedicated to the evaluation and intervention of dementias, has had as its main objective to stop, control or slow down the progressive cognitive-behavioral decline with inhibiting medicines of the acetylcholinesterase as are the donepezil and the rivastigmine. These medicines try to stop neuronal decline and keep / modulate the effectiveness of the cholinergic activity in the neuronal synapses. Other medicines, such as galantamine, try to strengthen cholinergic transmission. Finally, medicines as the memantine act as NMDA's antagonist. These medicines have as their final goal to allow to the non-damaged areas to send the information through cerebral circuits, and, in an indirect way, to keep the cognitive and psychological abilities in those instances where the cerebral circuits have been maintained in some way (something that happens in a significant way in cases of mild or moderate dementias).

However, mild-moderate dementia patients and their families have been proved repeatedly (in 75% of the cases) to be benefited -in addition to these pharmacological therapies- from



symptomatic and paliative strategies (Tárraga, 1991). These therapies come from diferent scientific areas and are based on different models of intervention (Table 1). Amongst them, maybe the most important is cognitive stimulation and other therapeutic and psychological measures more or less specific (Muñiz et al., 2005; Olazarán et al., 2004). In fact, cognitive activities such as reading, writing, participating in discussion groups, playing board games, playing a musical instrument or doing puzzles and crosswords, are one of the few activities that seem to diminish risk of dementia or to palliate the fast development of the disease (Verghese, 2003).

TYPES OF THERAPY ACCORDING TO FIELD OF INTERVENTION
<p><i>Cognitive stimulation</i></p> <ul style="list-style-type: none"> ➤ <i>Integral or General</i> ➤ <i>Specific (Memory, Attention, Language...)</i> ➤ <i>Orientation to reality</i> <p><i>Cehavioural Intervention (Relaxation, Emotional Control...)</i></p> <p><i>Occupational Therapias (Musical Therapy, Artistic Therapy, Equine Therapy)</i></p> <p><i>Motivational and Emotional Therapias (Montessori, Reminiscence...)</i></p> <ul style="list-style-type: none"> ➤ <i>Environmental Restructuration</i> ➤ <i>Therapies for family members.</i> <p><i>Therapies to encourage neuronal plasticity</i></p> <ul style="list-style-type: none"> ➤ <i>Therapy of aerobic breathing</i> ➤ <i>Therapy of Bioffef-back</i> ➤ <i>Sensorial stimulation</i>
<p>Table 1. Classification of intervention in dementias</p>

All of these kind of activities are based on the direct or indirect use of learning processes, the handling of psycho-afective implications to keep their mental abilities, and the preservation of the communication abilities our brain has with the outside world to exchange information and restore damaged circuits and functions. These techniques use, as a basic therapeutic process, the communication through different sensory organs with our cognitive processes: language, visual, auditive, motor, tactile, olfactory sensations; internal stimuli of the semantic, olfactory, auditive memory.. besides social, emotional and motivational relationships.



This way, it's necessary to establish cognitive intervention programs that optimize cognition, prevent behavioral problems and keep as much as possible of the cognitive functions of dementia patients. This intervention will have positive consequences on the family environment. It will be more adequate, and will establish premature support and psycho-educational programs aimed to both the family and the patient with the goal to diminish the emotional distress that entails a dementia diagnosis and other possible disruptions that stem from it (Zunzunegi, 2003).

1.2 The cognitive intervention programs in Spain.

The cognitive intervention programs aren't new and have a great deal of tradition in occident. In Spain as well. Most of the usual programs found in literature and applied on institutions treating persons with dementia have been training programs for specific abilities that try to rectify specific deficits (for instance, memory training, physical activity...). In good measure the programs used are conceived as modular, encompassing very specific intervention fields. This point of view might be adequate when treating damaged modular neuropsychological processes (as happens with certain aphasias, apraxias or consequences of focused ictus), and they can be very effective on people with mild cognition decline (Montejo y clbres, 1999) as happens with memory decline related to age. But it seems to have no sense on more molar neurological processes as is the case of Alzheimer's and other global dementias.

Another type of programs presuppose that the elder suffers from a kind of cognitive neglect. This neglect consequently produces a greater cognitive behavioral decline than the normal expected by the disease (Kitwood, 1997). They are programs that try to keep the general cognitive savings of the patients, or the retrieval of lost cognition caused by the lack of intellectual training, something usual when entering the old age (retirement, loss of sensory and physical abilities, etcetera.) Woods and Britton (1977) classified this kind of techniques as intervention for "reality orientation", "stimulation and activity



programs”, “environmental treatments” and “behavioral interventions”. They are generalist programs, that intervene on the general cognitive process and include very different educative tasks. An example of this are the latest interactive programs, like the computerized *SmartBrain* from the Fundación ACE (2006). These cognitive stimulation programs, so fashionable in recent years, can be very useful on persons without cognitive impairment and that start to suffer mild decline on their psychological functions. In fact, an improvement has been proved on these kind of people in different cognitive, behavioural and social fields. But they share a common criticism: they might have a lesser influence on persons with a greater degree of decline, given that they cannot be tackled from a neuro-cognitive rehabilitation perspective; the improvement they usually experience is merely transitory and, on occasion, they are carriers of frustration and emotional problems due to their inability to adapt to the real abilities of the patients they are directed to.

In recent years, these programs -those specific and these of general interest we have mentioned- have been so diversified that it has been necessary to attempt to classify them depending on their main characteristics, the population they are addressed to, the kind of technique they use or, simply, the materials that have been used (look the classification of the classic treatments for dementias suggested by Ferrario et al., 1991). Recently, the American Psychiatric Association (APA, 2001) also has hoped to classify psychotherapy and specific psychosocial treatments for dementias in four groups: Cognitive Approximation Therapies; Behavioral Approximation Therapies; Emotional Approximation Therapies and Stimulation Approximation Therapies.

Cognitive therapies include Orientation to Reality (ROT) therapies, learning therapies or cognitive therapies specific to certain processes (memory, language, etcétera.). Therapies of approximation to stimulation include recreational or artistic therapies (Musical Therapy, Artistic Therapy, etcétera) trying to activate all the resources the patient still preserves.

Considering the wide range of procedures, as well as the lack of internal coherence between them, the *International NPT Project* -that brings together a series of experts



on the subject of dementia therapies (Olazarán et al. 2006)- has labeled these proceedings as "what they aren't" rather than what they "claim" under the heading of Non Pharmacological Therapies (NFT)". According to those same authors, the NFTs are "non chemical" therapies. They are classified by the kind of person they are directed towards (patient, caregiver...). As a positive element of the work done by this project, we find that these therapies are defined as "theoretically backed up, focused and arguable". This places them inside the dementia intervention field.

However, this label has some controversial elements. First of all, this surprising label "NFT" acquires its meaning given the original field of activity of their authors. As we said before, intervention in dementias has been a classic field of the medical science, leaving limited room to the psycho-social science these type of programs denominated as "non-pharmacological" belong to. The reason for that has been the special neurological depiction of these patients. However, it has been decades since the psycho-social science has been studying, developing, classifying, conceptualizing and publishing different psychological, educational, social, and other kind of therapies, with the purpose of managing to maintain psychological functions. These therapies are already standard programs with clear conceptualization, objectives, methods and results.

Second of all, the explanation of the NFT's final goal doesn't seem very appropriate. These therapies are quoted to be "done on the patient or the caregiver and are *potentially* capable to produce a relevant benefit". The objective of every therapy, be it pharmacological or of psychological intervention, isn't to be *potentially* capable, but for its effectiveness to be proved using scientific procedures before accepting it as therapy. Likewise, alluding the fact that the NFTs cannot prove their viability through scientific methods as pointed by the Map of Non Pharmacological Therapies for Type Alzheimer Dementias (look Olazarán and Muñiz, 2009) seems to deny the scientific research on the psycho-social field.

Finally, the attempt to relate the dementia patient's disorders with those of their caregivers might be an unfortunate path to follow. It doesn't look like the typical



disorders of the people doing a task have any relation with the characteristics of the task. The pathology -the one that defines the kind of intervention that must be done- seems substantially different in persons with neuro-degenerative dementia than on those persons with emotional problems. In reality, this is quite the contrary: the caregiver's pathologies are similar to those of other patients with emotional and professional overload. And the appropriate professional tasked with implementing the intervention is different from a person intervening on persons with dementia, as is a neuro-psychologist or a neurologist.

What the International NPT Project did show up is the existence under a similar summary of a plethora of different types of intervention with very different denominations: *Cognitive Stimulation, Cognitive Training, Cognitive Rehabilitation, External Support, AVD Training, Reminiscence, Validation, Musical Therapy, Support and Psychological Therapy, Behavioral Interventions, Sensory Interventions, Physical Training, Trans-Cutaneous Electric Stimulation, Light Therapy, Relaxation, Massage and Touch, Acupuncture, Animal Therapy, Artistic Therapy, Recreational Therapy, Multi-Component interventions for the patients...* We can add more that don't appear on this list but are defended by other authors: *Chocolate Therapy, Multi-sensory Therapy, Vine Therapy, Biofeed-back, Sudokus, Thai Massage...* For the most part, these therapies aren't anything but adaptations of classic therapies used on other population groups of patients with dementias. These adaptations were done based on the equivalence of the goal to reach.

Finally, there's a last last factor to be weighed regarding the current condition of intervention programs on dementias, and that's the lack of collaboration between them. Each organization has developed his own intervention program. But the most of them don't know the work done by the others; frequently they don't even quote each other. The essential factor in science is the knowledge of the author/s of what's being done at the moment by their colleagues. And its replication. There are seemingly two reasons behind the lack of collaboration between authors: the first one is that most of them belong to private entities (finance companies, social service companies, multimedia companies, etcetera.), and therefore exclusivity rights enter the game. The second one is that they also have commercial value. If a treatment is going to be used by anyone, an oftentimes steep sum of money must be paid.



As a matter of fact, the *International NPT Project* compares itself to the economic value of pharmacological therapies. But this leads us to the assumption that they didn't do it through the perspective of the scientific investigation, but the commercial one. Therefore, its design doesn't allow neither to be replicated, nor to be compared with each other, nor it has an integrated self-assessment criteria. This way, given the difficulties to check its effectiveness, it's absolutely necessary to share the work between all the different carried out projects, find their common thread and, if possible, elaborate multi-centric studies with the purpose of bringing together hypothesis and conclusive results in relation to which treatments, in which cognitive processes, and for which type of patients they are effective.

For this reason, and caused by the long tradition these programs have amongst psychosocial trends we'll keep using the concept of **cognitive intervention programs**. The concept of cognitive intervention, as Dr. Peña Casanova declares, is a wide one, encompassing all the diverse methods trying to work with the patient's cognition, with the purpose of improving his behavior and performance. It's a concept that has its anchor in modern science, defining the type of procedure to operate with, as well as its objectives. It also defines clearly the results it aims to obtain.

In this sense, this situation is surprising because in recent years there has been an arduous work in programs that aim to become scientifically validated (Domenech, 2004; Tarraga, 2001). They aren't programs based on the idea of cognitive maintenance through training, but on them having a function of "therapy and rehabilitation". Basically, all of them derive from the impression that elders with dementia are able to learn, at least during the initial and mild stages of the disease (Calero, 2000; Fernández - Ballesteros y clbres, 2003). Ultimately, they are based on the idea of the neuronal plasticity of the human brain. This way, intervention programs agreeing with that idea of neuronal plasticity can be planned.



Most of them are global and integral intervention programs, relating to all the facets of the human psyche. This is the way they interact with the different individual, functional, cognitive, psycho-emotional and relational levels of a human . And we can already manifest the better effectiveness of these therapeutic and integral neuro-cognitive programs over the general and specific ones. The **integral cognitive stimulation** includes a multidisciplinary and assorted outfit of neuro-psychological intervention techniques to strengthen plasticity on persons with cognitive decline, therefore preserving and improving their cognitive functioning and slowing the decline process. One of the few examples of these kind of integral programs we have in spanish is the *Integral Psycho-Stimulation Program (IPP)* done by Tàrraga (1991; 1994; 2001). It's a model based on the concept of retrogenesis (Reisberg et al., 1999; Thornbury, 1993; Matteson et al., 1996). For this model, the dementia patient follows a regression, opposite to the cognitive development of a child. An alternative explanation to retrogenesis is the concept of neuronal compensation. The lost processes might be balanced out by intervention -thanks to intervention- of contiguous and alternative structures, capable of taking over the lost functions to some degree (Barroso, 1997).

This way, integral cognitive stimulation might be the road to follow on the process of dementia intervention. Programs developed under that perspective have proved their main effectiveness on the cognitive field, although almost all of them have been showing less effectiveness on the functional, behaviural and affective fields (Francés et al., 2003). This aspect is always alluded by the manuals as fundamental, and even on some occasions as its core idea (Boada and Tarraga, 2002; Martínez, 2002), but the necessary implicated processes need to be specifically developed in order to be added into the psycho-stimulation programs (look Figure 2 of emotional fundamental aspects in dementias). Almost always, this has been tackled globally, considering that the conative aspect has a general motivating attitude or that it encourages positive emotions. Without a doubt, there's still a lot of way to dig deeper into this field.



But the IPP isn't the only one available. In this Table 2 we go through the main integral or general programs we have available in Spanish. And most of them have already some kind of study about their degree of effectiveness.

TITLE	EDITOR	AUTHOR	YEAR	Type
Start again. Practical Activities for cognitive stimulation.	ACE Foundation	Tárraga, L. and clbres.	1999	Integral
Integral Psycho-Stimulation Program (PPI)	Caja Madrid	Tárraga, L.	1991	Integral
Let's activate the mind	La Caixa	Peña-Casanova, J.	1991	Integral
Memory Program	Madrid Council	Montejo, P. and Clbres.	1997	Memoria
Gradior Program	AFA Zamora	Franco et al.	2000	Integral
SmartBrain	ACE Foundation		2006	General
Cognitive Stimulation: Guide and Materials for intervention	Asturias' Princesdom	Martínez Rodríguez, T.	2002	Integral

Table 2. Spanish intervention programs for integral or general dementias.



2. Characteristic elements of ICAPD: *The train of cognitive intervention.*

We suggest here a new intervention program which includes the aforementioned premises of integration, appropriate aspects of the cognitive neuron-science. The Integral Cognitive Activation Program in Dementias (ICAPD) tries to be a program specifically directed towards intervention on dementias. It has the main objective of **encouraging cerebral neuro-plasticity** using neuro-cognitive training. Neuro-plasticity that allows neuronal re-stabilization altered by the injuries and the adaptation to the new neurological situation (Geschwind, 1985). Neuro-plasticity is an ability that's never lost, not even during the aging process or the neuro-degenerative decline. But it's necessary to maintain and encourage its proper functioning to allow, for the longest time possible, the maintenance of the psychological and cognitive functions. This way, proper and constant stimulation can cause favorable modifications in the structure and brain functioning of the elders (Cotman and col. 1982; Baltes and col., 1993).

An integral program must tackle the different fields of behavioral and functional cognitive intervention of the patient.

In our case, this program expects: (look Figure 3):

- ☀ To maintain and stabilize in the most efficient way possible the cognitive, conative and behavioral abilities of the patient that already has cognitive impairment and to slow down the decline for the longest time possible.
- ☀ To restore the forgotten or disused cognitive abilities building from the enduring ones.
- ☀ To improve the functional condition of the person during his daily activities.
- ☀ To control the symptoms and to prevent



Figura 3. Objetivos de intervención PACID



risky behavior.

- ☀ To promote social activity, prosperous aging and the physical and psychological well-being.
- ☀ To adapt an *structured intervention program sustained in proved levels of success by the use of internal verification controls*. This proved effectiveness must be verified not only in the cognitive, behavioral and functional fields, but in the social and even in the physical ones as well (Woods, 2003). At the end of this document a methodological self-assessment procedure is presented.

To achieve these specific objectives, our designed program has the following traits (in accordance with the expressions suggested by the APA, 2001):

☀ **A multidimensional e interdisciplinary nature**

It isn't a specific program for a field of action (for instance, memory) but a program that encompasses the most important intervention fields for the cognitive maintenance of the patient (look Figure 4). These fields will mix in the most useful techniques in order to achieve the objectives suggested above: This way, derived techniques coming from Physiotherapy, Neuro-Psychology, Occupational Therapy, Psychology or Neurology will be used. Techniques will be decided depending upon cognitive-behavioral traits of the patient, disease evolution, his mental ability, cognitive reserve...

The different techniques will be unified by way of a cognitive train, pulling through effort and intervention over the most important and necessary underlying factors and.



Figure 4. ICAPD Intervention Areas

cognitive processes, as well as the improvement over functional, behavioral and cognitive work of the patient. We define *the train of cognitive intervention* as the procedure trying to develop, over a series of station or intervention modules, the cognitive abilities in patients with dementia. The attention directed to conative aspects (motivational, emotional and volitive) will be used for the train engine to develop



those aforementioned conative aspects. The ones encouraging neuronal plasticity (oxygen contribution, cardiovascular performance...) will be used as fuel for the ideal development of these functions. The different train cars will represent each one of the big cognitive functional areas. The tail end car will work towards orientation to reality and cognitive and functional adaptation to the physical and social environments. All of these modules act over different cognitive processes, but the program will function as an unit, moving forward through the same track to the same destination.

Motivational and Promoter of Positive Emotion

We learn what we wish to learn, for what we are motivated to learn what we emotionally define as important. On top of this basis, the multidimensional nature of the program is based on the thought that the programs has to be highly good-natured and motivating for the patient. The program isn't a combination of repetitive activities (difficult to introduce in decline situations): it tries to encourage the intrinsic motivation of the patient for the cognitive work through activities of high ecologic validity, but nonetheless supported by basic psychological processes. Similarly to what's supported by some kind of intervention programs as the Montessori (Camp, 1999), the activities must be meaningful and invigorating in order for the patient to use all of his cognitive and emotional resources. At the same time, the sessions will set periods of physical and psychological stimulation for the patient, as well as rest periods, that will keep a positive emotional situation and therefore reduce the level of stress and anxiety. Within this emotional aspect, different situations will be prepared in which the patient could **recognize, understand and name his feelings**, as well as different aspects directly related with his personal biography and his memory. In short, the motivational and emotional aspects will be treated across the whole program and in each and every one of the sessions.

Personalized adaptation to the preserved needs and abilities of the patients: Individual Plan of Action (IPA).



The program will have clear inclusion criteria to define the action groups. Therefore, initial evaluations will be made to sort out the groups of the program, base on their well-being and functionality needs in daily life, besides the preserved residual abilities. From that information the IPA (Individual Plan of Action) will be prepared. The IPA is a framework that allows tracking for each case and guides decision making. It consists of a work program focused on the distinctive features of each person building from objectives, a dynamic work sequence and adaptable to the patient's evolution.

☀ **Methodology to evaluate the effectiveness of the program (self-assessment)**

A program that's not usable is not valid. A program that calms down the family but doesn't improve the patient musn't be used in any case. The program must have a self-assessment system that allows

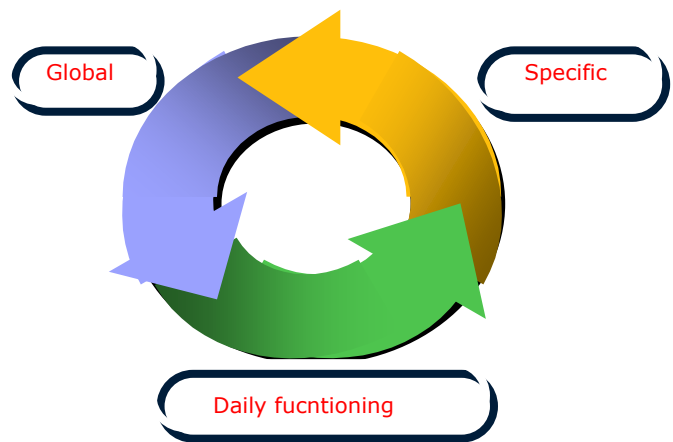


Figure 5. Assessed effectiveness levels

to check empirically the progress of the patient or the typological group of patients. The IPACD brings an assessment process of its effectiveness built-in in three directions (look Figure 5): Global effectiveness of the program through general tests, specific effectiveness of the different areas of action inside the program (specific processes self-assessed by the program) and effectiveness over the functioning of the daily life of the patient. Operation during daily life will address two essential items: life quality of the patient and control of inadequate psychological behavior. This procedure will track thoroughly the adequate scientific procedures in Psychology. In the final part of the manual a detailed exposition of the methodology to employ is made.

But, besides this classic features, the ICAPD adds some of its own (look Figure 6, IPACD's detailed list of features).

☀ **Open Program: Interactivity**



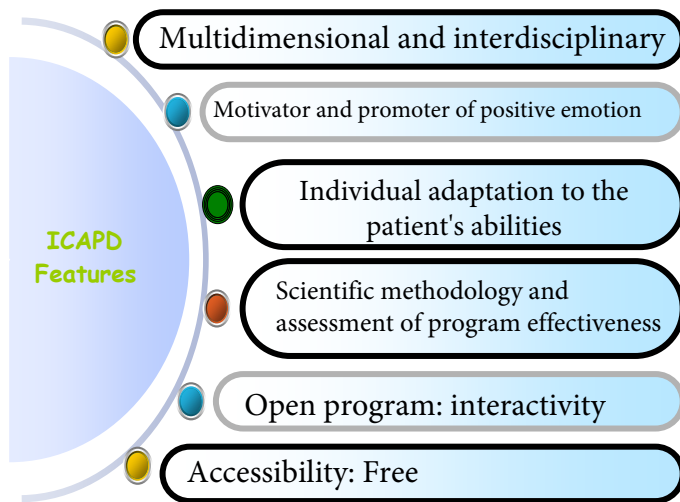


Figure 5. Summary of the ICAPD's features.

The IPACD isn't a closed group of activities or materials, but a system of task development, all of them supported by psychologist and cognitive processes. That way, what's offered -besides a detailed amount of materials- is a method to elaborate them. An IPACD observatory based on new *on-line* technologies will allow that any investigator/therapist can develop

new tasks that can be integrated into the Program. The objective is to get activities of a high psychological level that include the broad spectrum of psychological processes that might be damaged in patients with dementia. Or that can be efficiently optimized through training. The therapist's job will be to choose the ones that adapt the best to the needs of his patient and/or group of intervention.

☀ Free Accessibility

For the program to be truly open and interactive it's imperative that it's free-of-charge. That's possible because it's financed by public organizations (State's Model Care Center for Person's with Alzheimer's and other Dementias belonging to IMSERSO). This way, the IPACD will be available via website or official publications and its development can be managed from these public organizations.



3. Structure of the IPACD

3.1 Sequencing of the program

The program is developed over a 9-month period, in which 6 of them consist of direct intervention (about 25 full weeks). A lot of the intervention programs have a similar intervention time (Frances y clbres, 2003; Ferrario y clbres, 1991). Each week 3 group sessions (monday, wednesday and friday) will be arranged, of a duration of one hour and a half each. Tuesdays and fridays will be used for daily life activities or pending work (homework). Therefore, each intervention program would take around 100 hours to be completed. The other three months will be ones of evaluation. A month and a half of preliminary assessment of the patient (pre-evaluation assessment) and a subsequent month and a half of reassessment about the effectiveness of the program (post-treatment assessment). Besides, the evaluation will be constant during the whole intervention process, with specific tests done in specific areas. Once the program is finished, the situation of each patient can be reassessed, and a new intervention program can start, adapting it to the new situation: to analyze the difficulty level of the tasks, more complex process programs, etcétera.

Months:	1, 2	2	3	4	5	6	7	8	8, 9
Control Group	Valuation	Center's own treatment						Evaluation and data analysis.	
Experimental Group	Design	IPACD treatment							

Table 3. IPACD's yearly intervention sequence

3.2 Structure and Sequencing of each session

The structure and sequencing of a prototypical IPACD session can be seen on Table 4. The sequence to follow on each ordinary session would be always the same, varying activities, procedures and mediums. Adaptations for each program will be done in the difficulty of the techniques and tasks used.



As shown, on each session different psychological, cognitive and behavioral aspects are addressed. Programs that allocate each session to a different cognitive process might seem better structured, more logical. But it generates fatigue on the patients and removes the advantages of an integrating, global program. This way, the ICAPD expects to tackle the most cognitive processes possible on each session.

Each session starts with an stimulus activity, motivational and emotionally positive. It expects to encourage the self-control abilities and to generate a feeling of success on the patients. Afterwards, a breathing activity or of aerobic resistance is carried out. In third place, three activities belonging to the cognitive area are completed. Depending on the session, processes of feeling, perception, attention, learning, memory, thinking or language will take place. Sessions will be planned to have 60 minutes of real cognitive activity. That way, delays won't have an impact on the real 90 minutes sessions. Topics might vary between different sessions or weeks. In the same way, activities and procedures also will be as varied as possible. Each one of them has the greater degree of ecological value possible. It's expected that the activities involving pen and paper won't go beyond the 30% of the total allotted time (30 minutes).









ÁREA	CONTENT	ACTIVITY, PROCEDURE, MEDIUMS	TIME
	* Motivation and positive emotion.	* Theme presentation; initial evaluation of the patient's knowledge of the theme. Emphasize the control the patient has on the procedure.	5 mn.
	* Breathing	* Aerobic resistance training.	5 mn.
	* Activation	* Multisensorial stimulation	10 mn.
	* Recognition.	* Recognizing character's names.	20 mn.
	* Vocabulary	* Recover relationship's names.	10 mn.
	* Orientation	* Tell who he is, where is he, family events.	10 mn.

Table 4. Structure and sequence of a prototypical session

3.3 Inclusion criteria of the program.

Criteria of inclusion are essential on the program. The responsibility to avoid of negative effects of cognitive psycho-stimulation, such as the appearance of frustration, catastrophic reactions, agitation, anxiety and depression, fall on such criteria. Therefore, it's essential that the treatment programs offered are adapting to the preserved cognitive abilities of the patient, and to the tolerance to frustration he or she presents. This point is particularly delicate given the enormous heterogeneity between patients with dementia, due to the features they had before the cerebral damage (education, social level, employment..) as well as the diversity of the predominant cerebral damage (temporal, frontal...).



This program is directed to persons that are on the initial stages of the disease and presenting a loss of memory that incapacitates them on their environment. This training prepares them to maintain, for the longest time possible, the maintaining of their functional autonomy in daily life, helping them to adapt to changes. For the purpose of simplification, on the program there are two big groups, determined by the clinical evo-

-lutive scales of the diseases (look to Chart 2, Reisberg and cols, 1982):

GDS 4: Deterioro cognitivo moderado / demencia leve

- Déficit claros al realizar una cuidadosa historia clínica. Los déficit son manifiestos en las siguientes áreas:
 - a) Disminución en el conocimiento de acontecimientos actuales y recientes.
 - b) Puede presentar algún déficit en el recuerdo de su historia personal.
 - c) Déficit en la concentración, que se hace evidente en la sustracción de series.
 - d) Disminución en la capacidad para viajar, manejar de las finanzas, etc.
- No suele haber déficit en las siguientes áreas:
 - a) Orientación en tiempo y persona.
 - b) Reconocimiento de personas y caras familiares.
 - c) Capacidad para desplazarse a lugares conocidos.
- Incapacidad para realizar tareas complejas.
- La negación es el principal mecanismo de defensa.
- La respuesta afectiva se aplanan y el individuo se retrae ante situaciones de mayor exigencia.

GDS 5: Deterioro cognitivo moderadamente grave / demencia moderada

- El paciente ya no puede pasar sin algún tipo de ayuda.
- El paciente es incapaz de recordar detalles relevantes de su vida actual, p.ej. su dirección o número de teléfono que tiene desde hace años, los nombres de parientes cercanos (como por ejemplo sus nietos), de su escuela.
- A menudo presenta desorientación temporal (fecha, día de la semana, estación, etc.) o de lugar.
- Una persona con educación formal puede tener dificultad al contar hacia atrás desde 40 de 4 en 4 o desde 20 de 2 en 2.
- Las personas en este estadio se acuerdan de muchos datos importantes referentes a ellos mismos y a los demás.
- Invariablemente saben su propio nombre y el de su esposa e hijos.
- No requieren ayuda para el aseo ni para comer, pero pueden tener alguna dificultad en elegir qué ropa ponerse.

Chart 2. GDS Scale 4 y 5 as explained by Resiberg and clbres, 1982

☀ (GDS 4)

Moderate cognitive decline or mild dementia. The person keeps his autonomy and requires supervision on complex tasks. According to the studies of Reisberg et al. (1986) their MMSE scoring would be between

16 and 23. On these patients, preserved abilities and cognitive reserve of the patients will be used as basis.

☀ (GDS 5) With moderate seriousness symptoms and of moderate importance, reliant of a caregiver to carry out his daily routine. According to the studies of Reisberg et al. (1986) their MMSE score would be between 10 and 19. He doesn't remember details of his life as his telephone number or address, has problems recalling events, difficulty of attention even to subtract 2 minus 2 or tell the months of the year, time-space disorientation, poor spoken language and spelling errors, calculation problems in subtraction and problems choosing clothes. Because of this, work must be done on the basic aspects of cognition, simplifying the activities and making them more like routine. Besides, orientation to reality must be tackled in a more exhaustive way.



4. IPACD cognitive-psychological areas of intervention

As it is known, human cognitive system isn't an unitary being. Based on biological neuronal communication processes of the electro-chemical kind it is, at the same time, the mirror image of all of those different neuronal networks and nervous systems with different processes of information. All of those different neuronal processes have as an observable consequence the execution of a series of cognitive processes fundamentally different between them. Such processes can be defined and conceptualized, due to the different forms of interaction they allow us to the medium. Therefore, the different cognitive functions act as interrelated functional systems (processes), and at the same time different combinations and organizations of this cognitive processes come into play, based on the systems they support (structures) and relying, as a last resort, on the cognitive tasks the subject must answer to on a give moment (functionality).

In short (as seen in Figure 7), our brain is a calculation process handling, on one side, mental representations whatever kind they might be (emotions, motivations, expectations

memories, figures, words, smells...) and calculations on those same representations. Therefore, some representations (a memory) turn into another when our cognitive system transforms it)adds new data as when we see a move again and we produce new information out of it). Given that's difficult that we can act over the physical format of the cognitive

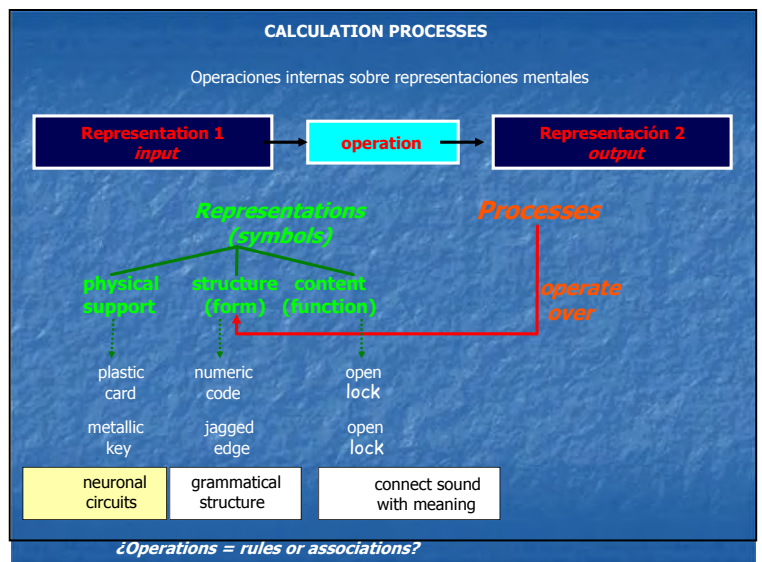


Figure 7. Calculation processes over mental representations.

system (the brain), we do can act over different cognitive representations produced during its functioning (motivation, emotion, attention, memory...). And we can act over the necessary processes to manipulate such representations. The final goal is to act over the function those representations and processes can perform: to talk , to dialogue, to specifically manipulate, to want to do things, to remember events, to remember one's identity...



A revision of which cognitive processes the ICAPD intervention focuses over is presented below (look Figure 8). Clearly there's an intention to intervene over those cognitive processes most affected by Alzheimer's disease (short term memory, early affectation of lexical-semantic abilities, different executive processes, time-space perception, etcetera.). But besides all of these, the decision about which processes must be tackled when doing the intervention program must be determined by the intention of working on those essential cognitive processes for cognitive functioning, and those of which the decline produces the most impairment to the patient's quality of life.

The essential processes for the cognitive functioning are those that determine the general cognitive functioning. In the first place we find the behavioral aspects. Our functioning depends on everything we love and we're interested on. The behavioral aspects (motivational and emotional) are essential to obtain a bigger cognitive effort

Taking decisions over which processes tackle on ICAPD

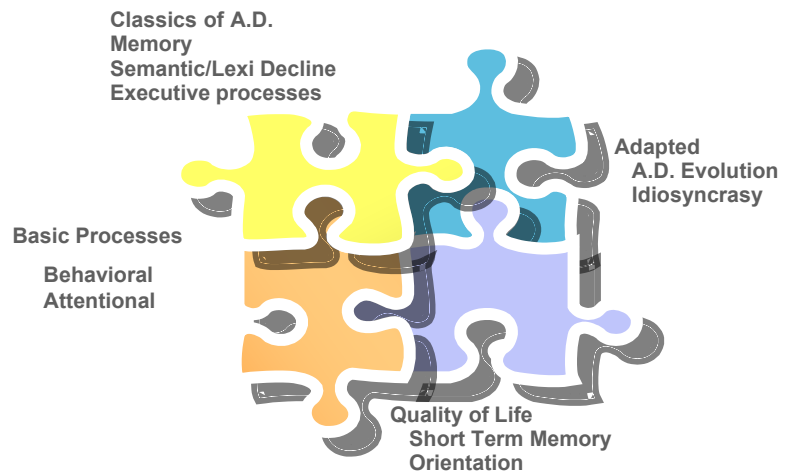


Figure 8. Sequencing processes tackled by the ICAPD

from the patient. Without an effective intervention of these to aspects, any kind of intervention will be almost useless. In the second place, understanding and attention are essential processes for language, memory and the rest of our cognitive processes. Although attention isn't an specially impairment process in A.D., an efficient intervention of the attention processes is necessary with the purpose of producing suitable learning and memory codification processes. Finally, a good understanding of memory principles is important in order to keep our cognitive processes



Regarding the intervention over those processes supporting the quality of life on dementia patients, this objective involves to tackle the damages that affect the most on their autonomy during everyday life. It's useful that an elder continues to be able to memorize words. But it's even more interesting if he's able to call on the phone, complete pending tasks, distinguish between different stimulus, to use memory clues to be able to position himself on the space, etcetera. Short term memory, Prospective Memory, Orientation, Attention.. all of those are aspects to tackle predominantly. In this respect there are the essays over virtual reality developed by Rizzo and col., (1998). Virtual Reality is the possibility to create training environments with a precise control of complex stimulus, and with a greater ecological validity.

Finally, the program's flexibility must have as a goal allowing to adapt itself to those functions involving the patient's individuality, as the individual differences and evolutive tempo, etcetera.

This way, the program explicitly states all the processes that are intervened. This implies that on each activity the different brain operations that are working at each given moment are being developed and clarified for the patient. This is done in a conceptual way (classic denomination inside the different cognitive sciences) and also with a number that will incorporate each activity's file card. This will allow the therapist to know in each moment what kind of mental operations and representations are being worked on. Given that in any cognitive task different operational processes are intervening (to say the name of his birthplace requires of different processes of remote memory, semantic search, vocal motor control, etcetera.) the outlined activities will involve different operational processes. In the following chapters we do a rough summary of the operational processes tackled in the different ICAPD activities with the digits that will appear on the activity cards. The name of the intervened processes won't appear.



4.1 Motivation and positive emotion



Traditionally, the old age and dementia have been characterized with the weakening of the personality traits, the reduction of the social activity, the reduction of interests, and the loss of motivation directed to a goal and the loss of initiative in economic and social matters (Gurin and Brim, 1984; Haan, Millsap and Hartka, 1986; Palmero and Meilán, 2008). The chart, presented on this way, may not be totally real, but we can describe some behavioral aspects that

might affect to the cognitive functioning of the patients. The loss of control in the declining process is one of those that have received the most attention by the investigators (Shaw and Krause, 2001; Mateos, Meilán and Arana, 2002; Palmero and Meilán, 2008). This interest comes from the relationship established on the 70s between loss of control, psychological well-being of elderly people, and even the mortality age of the institutionalized elders (Kahn, 1984; Rodin and Langer, 1977). The chain (according to writings by Kuhl, 1986) would follow the next sequence: (a) lack of control, (b) reduction of perception of control, (c) motivational deficit, (d) lack of activity and (e) accelerated aging and death. To that we should add the effects produced by the raise of negative stress and anxiety produced by the lack of control over his daily functioning (Palmero and Meilán, 2008). This sequence would follow an even faster and more evident process during neurological decline in which the patient is aware of his lack of control. The first years of evolution of Alzheimer's disease go by with a clear decline on his *will, perceived and real control* over his cognitive functioning, lack of *motivation* by the social aspects of his life and *anosognosia*. These processes usually give rise frequently to *depression, insomnia, agitation or anxiety*. Besides, the changes on the aspects of cognitive control can cause, likewise, *delusions* and *hallucinations*. Frequently this volitive changes end up in *violent and/or* wandering episodes.



This way, maintenance of volitive, motivational and emotional control is an essential facet to maintain the quality of life of the patients. And a way to prevent directly, as much as possible, behavior disruptions on the patient.

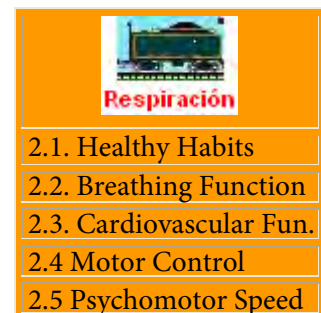
Something parallel happens regarding emotion. Occasionally, anxiety is defined as the energizer that eases execution of certain simple tasks; other times it's the factor that encourages focusing to obtain appropriate response to the task; on the other hand, it also can weaken execution of more complex tasks given that it energizes and encourages concentration about possible interfering, irrelevant or negative responses for the task as are ruminations, intrusive thoughts, etcetera. (Alpert y Haber, 1960). Emotional control in problem resolution is another essential aspect in AD patients, whose emotional responses interfere repeatedly about functional and cognitive execution.

In this way, the work on the encouraging of motivation and positive emotion turns into an essential part of the program. Something that has been repeatedly proved by works as the ones realized with therapeutic procedures in Montessori to persons with dementias (Camp, 1999). This way, the principles stood up for in these programs are maintained on our intervention. This is done emphasizing the ecological skills of the tasks as well as the patient's abilities, encouraging their social activity, and favoring intergroupal relations to facilitate group cohesion.

4.2 Breathing: Aerobic Therapy

Cognitive work demands the best neuronal functioning possible on the patient. Functioning that's based on an adequate metabolic and aerobic contribution of the blood flow. The loss of breathing and blood flow health has been recently

shown as a defining factor for A.D. (Wilson and clbres, 2002; Verghese and clbres, 2003). It's a factor determined by the progressive slowing-down of the motor and sensorial functions of the patient both on his afferent (audition, vision, touch, olfactory and gustatory) and efferent (motor movements) facets. This way, during the evolution of the disease we find a progressive and general slow-down, loss of reflexes, balance problems,



psychomotor loss affecting to writing and painting, and a decline in perception and knowledge of the body functions.

In this section of the treatment, and using the help of medical staff, the goal should be keeping and improving through physical exercise the breathing, cardiovascular and motor functions. Two models of intervention take place here: (1) Preventive, changing unhealthy habits for dementias as are somking, alcoholic drinks or problems derived from traumatic brain injury (2) Rehabilitative, as is the consumption of anti-inflammatory pills, encouraging a diet with antioxidant during free time (fruits, vegetables, etcetera) or doing exercises that encourage the breathing functions.

Inside this facet, the execution of aerobic breathing exercises is the focus point. In recent years there has been insistence about the importance of aerobic exercise and cardiovascular adjustment over the maintenance of cerebral plasticity during the life cycle. Mahendra and col. (2003) proved that physical exercise can be effective on Alzheimer's patients when it comes to slowing down cognitive decline associated with this disease. Yu and col. (2006) confirmed that the best way to achieve such slowing-down is through practice of aerobic exercise. Aerobic exercise can encourage the angiogenesis¹ (Cotman & Berchtold, 2002), the neuro-genesis² and the cognitive plasticity through the improvement of executive, cognitive and time-space functioning (Colbombe et al., 2003; van Pragg, et al., 2005). Various longitudinal studies (Yoshiuc, 2006), have found positive correlations between practicing physical exercise and a slower speed of cognitive decline of people throughout their lives.

Therefore, these kind of therapis have as specific goal the increasing of neuronal activity and, as a consequence, the increasing of cortical plasticity. This is produced through the rise of vascularization, survival and resistance to brain damage, the rise of serotonin, dopamine, and the neurogenesis, specially on the gyrus dentate. In fact, greater levels of grey matter (a volumetric increase) have been found on elders with a

¹ Angiogénesis is the creation of new blood vessels from pre-existing ones.

² **Neurogénesis** is the production of the cells from the Central Nervous System (CNS), that is, of neurons and glial cells.

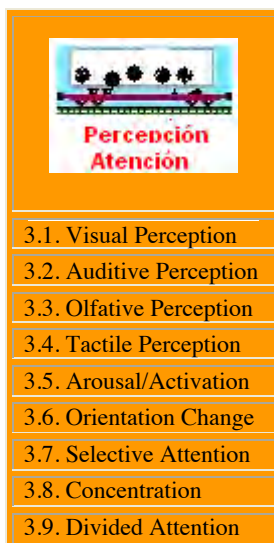


a greater level of physical health due to aerobic exercise.

In recent years, neuronal plasticity has been proved to have direct effects over cognitive activity. Specially on attentional aspects. The increase of cardiovascular adjustment has as a result an important increase of some facets of the attentional cerebral network, specially on tasks that involve cognitive change .

A new intervention program, in accordance with the possibilities of the structured group, must be done with the purpose of encouraging a proper aerobic breathing and the maintenance of the body motor control. The exercises must be of focused movement with voluntary control, as is walking five minutes at a fast pace, walking on long strides, stationary bike, dancing salsa, postural control, abdominal-diaphragmatic work, rhythmical breathing, productive coughing, etcetera. Besides, these kind of exercises will cause the necessary cerebral activation for the rest of the session. Aerobic exercise is fundamental for oxygenation and a good brain functioning.

Finally, the works inside this module have an indirect impact over the driving function on aspects influenced by the disease as is the decrease of the sense of awareness, visual and vestibular, the increase of the reaction time to stimulus, the slowing-down of the reflexes, the decrease of muscle tone and strength, the gear change when driving a car, etcetera.



4.3 Perception and attention: Sensory Stimulation.

Long-sightedness, keratitis, presbycusis, decrease of touch sense.... They are some of the decaying factors disrupting the stimulation input and isolate the patient from the outside world. In case of dementias it has been considered that there wasn't any decay greater than the one caused by the changes related to aging. But this is true only when talking about sensory processing. But it isn't the case when talking about the perceptive area. There has been damage found on the first stages of the disease, specially in the process of sensory integration. An example of this are the



agnosia problems, or problems perceiving complex elements as are faces (prosopagnosia), smell (anosmia) or colors (achromatopsia). An special incident are difficulties of space recognition (be it tactile or visual). The complexity of these perceptive systems lies on the organization of visual, auditory or any kind of stimulus with meaning.

The isolation produced by attention deficit disorder is added to these impairments. The same way it happens with the feeling, it has been confirmed recently that there aren't any problems on the patient's conscious level. Although there have been found problems because of distractions due to the lack of concentration, the low arousal level or cerebral activation, the impairment in orientation response or change of orientation to new stimulus (negligence) and the impariment on the filtration capacity or selective orientation (unilateral lack of attention).

These perception and attention impariments stop a proper processing over the remainder of the cognitive processes. Because of that it's essential to work in this area. In this way, it must be an special area of cognitive work, and prior to the rest of the cognitive exercises. Therefore, attention activities to original stimulus, selective attention, concentration, stimulus recognition, etcetera... will be worked on.

4.3.1 Sensory stimulation therapy

The process we're going to follow is the sensory stimulation therapy in dementias. Its main objective is to increase sensibility and discrimination through training of the sensory receptors, which are stimulated in isolation and simultaneously in multi-sensory approach. As a result, to encourage neuronal and cognitive plasticity processes is expected. With the idea of neuronal and cognitive plasticity we put into words the cerebral ability to minimize impairment that comes from structural and functional changes, whatever the original cause is (Pascual-Castroviejo, 1999). This way, physical activity and environmental sensory stimulation can activate the brain plasticity mechanisms and refurbish the brain circuits of a damaged brain.



Until a few years ago it was thought that persons with A.D. suffered an essential weakening on their ability to learn, and therefore any attempt of cognitive intervention would present very limited results, or even presumably none. However, in recent years it has been proved that elders or even those persons diagnosed by Alzheimer's disease on it's mild or moderate stages can also learn, although in a limited way (Calero et al., 2000; Fernández-Ballesteros, Zamarrón, Tárraga, moya, e Iñiguez, 2003). The biological basis of this learning ability stem from the ample empirical evidence available about the ability the injured neurons have to regenerate and establish new connections (Goldman, 1995).

In light of that situation, the possibility that the brain experiments sculptural changes throughout it's vital cycle it's currently considered, and it's accepted that during old age, and even on disabling conditions, phenomena as synaptogenesis, neuritogenesis, and neurogenesis can be developed. Cerebral plasticity is produced to the extent that new experiences are generated, which via internal and external stimulus produce structural and functional reactions in the sinapse (Mattson and Camandola, 2001).

Sequential Sound Therapy (SST) has been used primarily to modify or subside the perception of the auditive tinnitus. Sound treatment consist of causing a neural stimulus, customized and combined with an specific music. Trough a music reproduction device, the sound program will cause a pleasant stimulus to the patient. This stimulus, focused for each patient in accordance with his psychological profile, will stimulate the routes of the auditive system, causing a gradual change on the neural plasticity of the auditive cortex.

Modalities of Sound Therapy are implemented inside the Snoezelen ambient multisensory stimulation programs of ambient (used for relaxing or with learning purposes) or the Lozanov method. This consists of an aural stimulation that combines baroque music and language through reading. Basically, it aims to play the music at 60 beats per minute, simulating the one of the human heartbeat, in order to provoke alpha waves. A recent example of these kind of therapies is the Electronic Auditory Stimulation Effect (EASe, 1996; <http://www.vision-audio.com/>). With this kind of



cZ h YUdmU [YbYU' fYX Vjcb' cZ U Xlcfm\ndfYbgghj]lmjg' UWYj YZ Ug' k Y' Ug' Ub']a dfcj Ya Ybhc' gci bXgYbgV]]hazj]g U' WbUWz bcbj YfU' UbXj YfU' Wa a i b]Wjcbz g'Yd' Wbfc' z Ya chcbU' gYZWbfc' UbXUhbhcb' ZcWg" Gi ha UhYhYa cghYUvcfUY]g H'Y @]gYb]b[' Dfc[fUa' fH@D' \hd #k k.k.thelisteningprogram.com). The TLP']g U hfUj]b[' gngYa' cZ h YU fU' gngYa' lc' dfcWgg' h'Y gci bXk]h' dfW]gcb" 5 'Xfj Uj Y cZ h]g']g' h'Y 6fUj' :]h'Ygg' Dfc[fUa' 7' UggVj']b' k \]W' h'Y UWj]h'Yg' cZ ']gYb]b[' UbX a Ya cfm]b'dYfgcbgk]h' dUhc' c[]W U]b[' UbXXa Yb]UfY]a dfcj YX

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: cf'mUfgzh YF\Ug' VYb' XcWa YbU]cb'cb'h'Yj Ui YcZa i 'hgYbgfmi]bhYj Yb]cbg'h'Ui dfca ch'YfYU U]cb' UbX dcg]h] Y WbX W] U' WUb[Yg' fBYU]b' % -) ž < i hW]bgcb' % - (E']b' Xa Yb]Ug' ' Hfci [\ ' h'Y g' dd'm cZ gYbgfmg]a i ' i g' bcb' gfi W] fYX UbX bcb' g'Yei Yb]Uz a i 'hgYbgfmi]bhYj Yb]cbg' h_U Y Uj UbU Y cZ h'Y gYbgfma clcf' fYg]X U' U]]h'Yg' cZ dU]Ybg' k]h' Xa Yb]U fBU_Yf' % - +ž 6YUhm' % - , ž 6i YhbYf' % - - ž < cdY % - , E' A cZUhf' % - ' E' d]cbYfYX cb' h'Y i g'Y' cZ h'Y g'bcYh'Yb' flb' g]W]Wfcca' cZ a i 'hgYbgfmg]a i ' U]cb'Zcf'dYfgcbgk]h' a cXfUY'lc' g]f]ci g'Xa Yb]U' H'Y g'bcYh'Yb']g' Wa a cb'mi g'X Ug' U h'YfUd' h]Wa cXU]m]b' Xa Yb]U W]Y cb' Zci f' fYUg' f]E' F'YX Vjcb' cZ VUX UXi ga Yb] VYUj]cf' UbX Ub']b'WUg'Y cZ h'Y dcg]h] Y VYUj]cf' f]Y" 6U_Yf' % - +ž < cdY % - , ž @cb[' % - &ž f]E' YbWi fU]b[' U dcg]h] Y a ccXUbX Ya chcbU' WbX]hcb' f]Y" ' 6U_Yf' % - +ž D]b' bYm' % - +ž fl' E' dcg]h]]m' cZ]b'YfU]cb' UbX Wa a i b]Wjcb' f]CdU' `` % - , Ež UbX fl' E' YbWi fU Ya Yb] cZ U dfcdYf' fYU]cb' cZ Yb]]fcb' Yb]Uhb]cb' UbX h'Y fYX Vjcb' cZ Uhb]cb' g]fYgg' fA W Ybn]Y % -) ž GU U Y % - *E" 5 'h'ci [\ ' h'g' U]h' dc]bh]g' h'Y cb'mcbY h'Ui \Ug' VYb' k cf_YX cb' Uci h' h'Y h'YfU]Yg'ic' V]Wj Yg' f]U]Ybh]g]a i ' g'zh'YF]g' U' UW' cZei U]m]Ya d]f]W' studies about these cognitive aspects (McKenzie 1995, Morrissey 1997, Savage 1996).

4.3.2 The bio-feed-back as neural therapy

Attention control isn't just one being, but -as James already affirmed- a cognitive process that can be controlled through different cognition fields (memory, person motivation, planning or frontal executive processes, thought, thinking, language,



conscience, etcetera.). One of the most relevant ways of control we use in our daily life is the feedback we receive about how adequate our own neurological functioning is, or the cerebral arousal, as well as our own emotional condition. In both cases, our degree of neuronal and emotional activation runs, controls and modules the strength and orientation of the attention. But on some occasions, automatic control or affective-emotional disorders can alter the adequate attentional abilities to respond to our environment.

Neuronal therapy is a non-invasive, stimulating and interactive computerized technique, that allows through positive external reinforcements (visual and aural stimulus) the extraction of the activity from the delta, theta, alpha and beta cerebral waves and, with his training, the normalization of the electroencephalogram pattern. To control and manipulate this cerebral activity, different methods have been used. On one side, the Electro Encephalographic Feedback Method or EEG BFB (Monastra, Monastra & George, 2002) in which the execution speed of different tasks (games, sounds, films, stimulus) are directly related with cerebral activity (visual and/or aural feed-back). On the other side, the studies about modulation of cerebral activity from the emotional system.

From the EEG BFB studies, known as well as the neuronal electroencephalographic feedback, different researches suggest that the brain is able to train itself to increase the activation levels (rising the activating beta waves of the attention and reducing the theta sleepiness waves). The fast EEG waves specially, beta waves, are used to increase the cerebral activity achieving, this way, to increase the operational ability of certain superior cognitive processes. This way, the objective of neurotherapy usually is the achievement on some particular electrodes of the activity increase on bandwidths of 12-18 Hz and the decrease of bandwidth between 4-8 Hz and/or 22-28 Hz (theta and/or beta). Treatment of neurofeedback applies to the patient through clues that could be as simple as a sound signal or as complex as a videogame. neurobeedback works as some kind of mirror: using the retrofeedback signal we learn to optimize these processes.



Training to modify the components of specific frequencies by means of the EEG BFB has been used both in basic investigation as in clinic, including the treatment of epilepsy (Kotchoubey et al. 1999, Sterman 2000), attention general disorders (Lubar and cols. 1984, Rossiter and LaVaque 1995) and hyperactivity in particular (Butnik, 2005), kids with studying deficit (Foks, 2005; Monastra et al. 2005) and other fields (Saxby and Peniston, 1995).

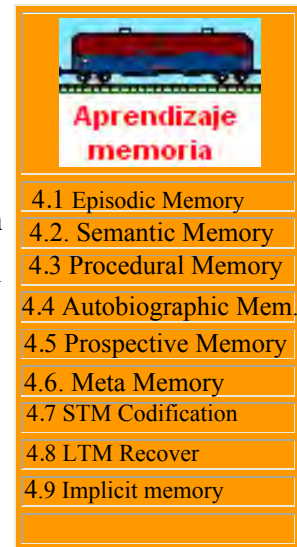
4.4 Learning and Memory

These has been repeatedly considered the processes most associated with dementia since they are the first ones and the most evident on their decline. Besides, they are the most studied from the cognitive neuropsychology perspective and the ones which the basic processes on a biological, neuronal and cognitive level are known the best. Alzheimer starts causing difficulties to learn, retain and recall recent events, being one of the first brain disorders perceived by the patient or his familiars. They also forget the moment when they have to do their pending matters,

also called prosepective memory (slips when taking their medication, forgetting the time to look for their grandchildren, etcetera.). It's the oversight on the elder's part of recalling actions they have to do in the future.

Impariment due to, partially, both to memory and will facets. In fact, the importance of failing in this kind of memory (for instance, oversight when switching off the kitchen burner) it usually is a relevant symptom of cognitive decline, and also the main reason why the patient goes to his general practitioner. (Meilán, Pérez y Arana, 2006).

This way, the amnesiac effect starts with difficulties to learn new information (specially verbal types of learning), while some minor disorders involving the recalling of past information appear. Likewise, some short term memory (STM) problems arise, as well as on the recalling of lived incidents (episodic memory), visual memory, and most specially, anomies (impairment on the semantic memory or our way of looking for words to say something). It worsens in the most advanced stages, reaching to widespread obscurity even on their personal identity, although a time sequence on the affectation of



the different types of memory is recognized, with an insidious beginning and a gradual progression.

During intervention, it has to be taken into consideration that some factors have to stay preserved: the learning skills, short term memory and implicit memory, as well as the serious impairment on the STM, due mostly to problems registering, codifying and processing information.

Another element to be taking into account is the impairment on different types of explicit memory: problems on episodic, semantic and autobiographical memory have been found, as well as problems on STM because of the decline when processing the information quickly (Ritchie and clbres, 1997; Small y clbres, 1999). It's necessary to teach the patient to code the stimulus again encouraging richer, stabler associations. Codification might be improved through multi-modal codified stimulus. For instance, learning words through different levels of association: vehicles classified by brands, color, emotions, acquaintances that own them (Opel, blue, fast, my son, etcetera.). We'll also find decline on recovery about which we'll work on using indications, clues, association recovery, the method of *spaced retrieval* (Landauer and Bjork, 1978; each time using longer retention periods and checking if the memory is still there), or the *vanishing cues method* (Glisky, Schacter and Tulving, 1986; vanishing cues, learning technique on which the indications provided to the patient concerning the information to retrieve are dissolved progressively; they learn a name and they are given 5 of its letters, then 4, then three...). Finally, daily life learning: automation of certain daily life procedures as personal hygiene, itineraries, etcetera. (Zanetti and cols., 1997, 2001). Besides that, the patient will improve his daily life by learning to use certain kind of external help as pill poppers, alarm watches, memory diaries, electronic agendas, etcetera.


Another field of intervention is meta-memory. Meta-memory is reflected on self-justification about the difficulty of execution of tasks, subjective perception of the decrease of their abilities and the continuous complaints over their performance in memory abilities (Mateos, Meilán and Arana, 2002; Ponds, Commissaris and Kolles,



1997). This subjective perception directly affects the patient's perception of control. It's necessary to encourage an objective vision of his damaged and preserved functions.

4.5 Thought and Language

As a general rule, they are the most subtle change because the patient usually tries to avoid it by using substituting behavior. As a result, they aren't evident most of the times. Likewise, they usually are veiled by the cultural level of the patient. In some cases supporting the problem on some patients with a low cultural level; on others, as a way to avoid the problem when the patient uses his cognitive reserve and intellectual work to dodge the difficulties. However some problems can be found during the first years of the disease. Problems that could vary enormously depending on the individual evolution of the disease:


5.1 Executive Function
5.2 Work Memory
5.3 Space-Time Control
5.4 Phono. verbal Fluency
5.5 Praxias
5.6 Activation & Interest
5.7 Emotional Control
5.8 Perseverance
5.9 Reality Orientation
5.10 Calculus

A. The basic aspects to tackle during intervention on thought processes are:

☀ **Executive function.** Caused largely by problems managing attention change, they have as a main consequence the difficulties on the development of sequential activities. It's specially a peculiar decline of the frontodorsolateral syndroms, besides the specific problems that might appear early like the ideomotor apraxia. This way, encouragement of the executive function must be done when performing behavior patterns directed towards a goal. It involves planning, organizing, starting and finishing an action. Therefore, the intervention is done so the patient can:

- Generate hypothesis, plan actions and make decisions to achieve a goal, focus their attention on it, analyze results and change the tactic if necessary, and avoid being held up by irrelevant stimulus.
- Work memory: keep "in mind" the information he's going to need soon, while doing an specific action (it's a STM).



- Organizing events on a timeline.
- Verbal and non-verbal fluidity: to generate words and grammar structures both on oral and written language, depending on the first phoneme.
- Ideational apraxia: Doing body-language sequences or motor programming while doing alternating or mutual motor tasks with their hands, procedures with objects, etcetera.
- Constructive apraxia: Recreate models, build puzzles, shape objects, etcetera.
- Avoid behavior changes that block executive abilities: apathy, slowness, inattention, lack of motivation, dependency to the environment, absence of curiosity or depression.

☀ Adaptation in time, space and intensity of the behavior in response to an external stimulus. Its decline it's typical of orbital-frontal syndromes. On these cases it's essential to encourage the level of control of the patient over abnormal behavior:

- Of impulses (aggressiveness without motive, bulimia) or incompetence to inhibit wrong or reiterative answers.
- Imitation of the examiner.
- The "moria" or sense of humor nobody finds funny.
- Euphoria, sometimes even mania. Even Obsessive-Compulsive Disorder.

☀ Akinetic Mutism or apathy. Abulia. Mesial syndrome deterioration. In these cases it is necessary to promote needs, interests, analyze expectations, program activities, send tasks, etc. many of these tasks are associated with the motivational aspect presented above.

☀ Orientation to reality

Space-time-person disorientation, becoming complete in the most serious stages of the disease, appears already during the earliest stages, being among the most incapacitating aspects because it affects the patient's degree of autonomy, and generates among the most anguish in the family and caretakes because of the danger that implies to the physical integrity of the patient. Therefore it's essential working with information related with orientation (date of birth, current date, family names, etcetera.), which is considered to provide to the person a better understanding of what surrounds him, and possibly produce an increase of the control perception and self-esteem (Verghese et al., 2003; Folsom, 1966; Brook, 1975). This conduct implies to work on managing



the recent episodic memory. But it also helps the work on biographic and remote memory management work. Drummond and cols. (1978) established structured intervention programs specifically for reality orientation. Spector et al. (2000) have done an elaborate revision of all of the studies made. This way, one of the most classic therapies can be done throughout days with orientation tables, newspapers, weekly papers, notebooks or personal diaries, personal cronology, etc. These kind of work demands the caregivers' collaboration. Elements as reminders, data sharing, personal memories therapy, etcetera... are introduced in the PACID's sessions.


☀ Calculus

It's the well-known ability to manipulate numbers in arithmetical operations. It implies reasoning processes, sequencing, orientation on the number's position on the actual space, subtraction work memory, numbered table's memory, focus. This way, the strategies of problem solving, number symbolism or spatial decline will be preserved.

B. Language aspects that must be taken into consideration:

Again, it has been common to considerate language as an entity preserved only to dementias' as Alzheimer. This can be due to checking that the language is one of the essential elements of what has been denominated cognitive reserve. However, it isn't like this if we compare the differentiating aspects of comprehension *against* language production and the

aspects of its diverse levels of analysis (phonetical, morphological, syntactic, semantic, grammatical and sentential). In this way, diverse elements of the language can suffer decline from the beginning of the disease. Impairment that can end up incapacitating comprehensive and productive language. Amongst others, we can find changes in oral language as the anomie or word oversight, language without content or excesively simple, changes of words due to the attempt of sidestepping anomie's problems, impairment on semantic fluency...


5.11. Oral Comprehension
5.12. Denomination
5.13. Semantic Fluency
5.13. Ideomotor Apraxia
5.14. Motor Writing
5.15. Grammar Writing
5.16. Reading
5.17. Syntax and Association
5.18. Phon & Prosod. Fluidity
5.19. Reasoning.



Besides, we find writing alterations as are excessive simplification and loss of its psycho-motor execution.

In this way, a global intervention must help the patient to keep his reading, studying, radio listening habits, etcetera. Additionally, most specific interventions must be done regarding activities as:

- ☀ Promoting comprehension fluency and phonetic and prosodic production. Both in the oral and writing levels. Paraphasias will be avoided.
- ☀ The denomination. Avoidance of anomie or semantic paraphasia.
- ☀ Practicing ideo-motor praxia from verbal orders
- ☀ Writing, both from the motor and the space-visual standpoints.
- ☀ Syntax and word-association abilities.
- ☀ Reasoning and Abstraction: Text comprehension and oral and written stories.



4.6 Autobiographical Memory and Relaxation

The sessions must always end driving the patient to a positive emotional status and helping him to return properly to his environmental reality. To that end, there's nothing better than to use autobiographical memory programs or memories of a positive life and relaxing

programs.

The reminiscence or life revision technique includes the discussion of past activities, incidents and experiences, with other persons or group of people. The difference between both of them it's that the reminiscence employ more social, informal methods, while the life during the life revision more structured and generally inividual techniques are employed. These memories are usually provided through help like videos, images, files and books with the patient's life history. During the Cochrane group revision some meaningful results came through: cognition and mood improved after four to six weeks from the beginning of treatment, caregivers that were involved reported a decrease in



exhaustion and found that persons with dementia showed some signs of improvement on functional ability. Not a single harmful effect on the resulting measures reported was traced. However, considering the limitations of the examined studies, there is an urgent need of additional quality investigation on this field.

Life history allows to go beyond the room sessions. The patient can start filling a book of life history with the most important incidents that have been happening, and he can do it as a kind of homework in his bedroom or during spare time.

The final relaxation technique allows to associate sessions to positive situations, distant from the pressure of the tasks to do or the mistakes committed. The relaxation technique must be mixed (physiological-cognitive) so it covers both fields. Learning a relaxation technique is of great interest for the patient on other fields of action. Finally, it's convenient to use procedures of sensorial stimulation. The multi sensorial stimulation procedures have confirmed their effectiveness controlling abnormal behavior and patient relaxation; on the contrary, they have proved less effectiveness on the field of cerebral activation.

In IPACD's case we resort to both of them: occasional group reminiscence, and, also, individual life revision. For that purpose an original technique is used: "life revision through music". Specifically using different moods of music (happy, sad, dancey, saloon, wedding...) with the purpose of recalling different kinds of memories. These memories have to be treated from an emotional point of view; they have to be valued in a positive way, that is, highlighting the accumulated experiences and the intensity of the life lived.

In a recent study we did an utility check of this procedure to recover events from the patient's autobiography. With this study we tried to prove that recovering information from autobiographical memory is more effective when induced by a musical stimulus that's used as an effective "memory" track. In this case, the music as a memory instigator recalls better the autobiographical memory of the patient than non-musical sounds or than the absence of it. This result drives us to conclude that structured



(musical) sound has an important role when making easier obtaining a memory. According to the interpretation made by Foster et al. (2001), the ability to remember better autobiographical information after a musical stimulus is owed to the increasing of the attentional levels (arousal) or the increasing of the attention absorption (Salamé and Baddeley, 1989). We add to the mix that this fetching effect happens not only because of attentional reasons, but for the importance of the emotional aspect as well. The induction of an emotional component shares and favors the memory retrieval. The importance of the emotional context over the consolidation of memories or long-term potentiation (LTP) on memory. The LTP suffers from a progressive decline during the aging process and it's specially vicious in dementias of the cortical kind given the neurological damage to the tonsils and hippocampus zones (Gordillo et al., 2011). Besides, we've found, as expected, differences between the specific kind of music the autobiographical memory recalls. It's the music classified as inducer of sadness the one producing the meaningful differences in the execution of autobiographical memory, opposite to the evocation done by non-emotional music. We therefore find a bigger level of execution induced by the sad music than the memory induced by new music, cafeteria sound and no sound. Regarding the music classified as inductor of happiness, differences are marginally significant at 0.58. To the contrary, we don't find beneficial effects of happy music over a autobiographical memory against any other kind of sounds. This result is surprising since happy music had all the ingredients to work better as a memory track (Foster et. al, 2001). Music from Vivaldi's Four Seasons has a familiarity component (best kind of memory track) than a medieval motet unknown by all the patients, although mourning music has a familiarity component as well. This result is confirmed by the hypothesis regarding the differences processing the emotions of sadness and happiness (Meilán et al., 2011), and confirms that emotional music acts as a track associated to past memories as well, differentiating then the non-emotional music. This way, we can hypothesize that sad music has a greater adaptation level associated with Alzheimer's Disease not achieved by happy music. That is, despite of having controlled the absence of depressive symptoms typical of the AD on some patients.



The comment proposed by Foster et al. (2001) it's also interesting, as it involves the memory areas mostly affected by musical stimulus. The areas defined as "remote" and "medium-remote" are the most affected when the participant is subjected to a musical stimulus. It's not the case with recent memory. This way, we seem to confirm once more that both types of autobiographical memory work differently. We've found that during recovery of remote music, sad music has a clear, different effect in front of happy music. It's not the case with medium-remote and recent memories. Therefore, the marginally significant value found on the global results are due to the limited effect on medium-remote and recent memory. This way, remote memory seems to work as a semantic memory, affected by emotional memory tracks, while the recent memory works as episodic. Therefore, the way to tackle both kind of memories for its maintenance during the evolution of the disease must be different. Finally, these results signal the need to keep looking into which are the important parameters that do real rehabilitating when applying sound therapy. As we can see, the Vivaldi/Mozart effect could be more effective if we call it the Chopin effect.



5. Materials and Resources

5.1 General resources

- ☀ Interactive programs with computers ordenadores (Hoffmann and clbrs, 1996; Franco and cols., 2000; Franco and Bueno, 2002)
- ☀ Care rooms for elders and caregivers
- ☀ Neuropsychological exploration room
- ☀ Computerized cognitive experimentation room
- ☀ Gymnasium
- ☀ Multi-sensory stimulation room
- ☀ Projectors, Computers.





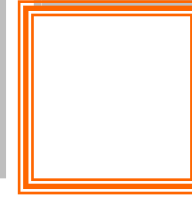
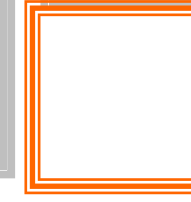
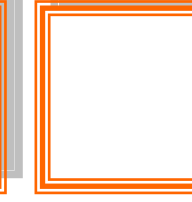


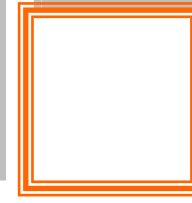
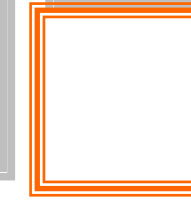
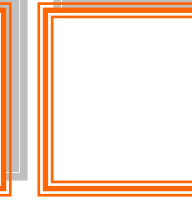


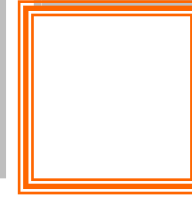
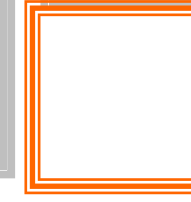
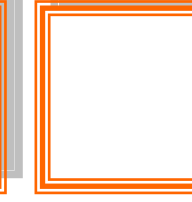


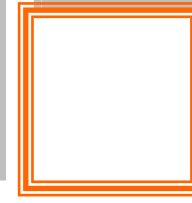
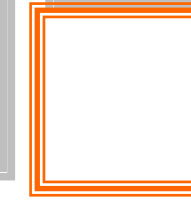


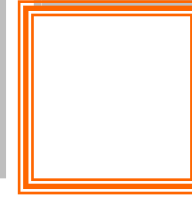
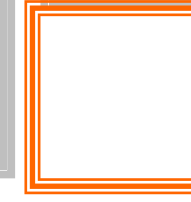
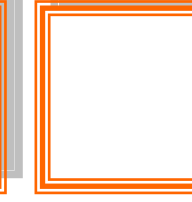


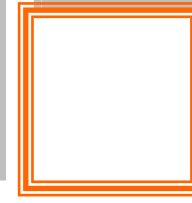
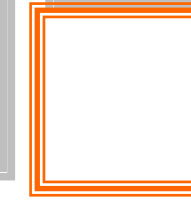
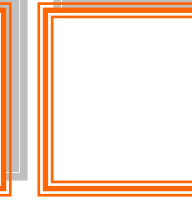
5.2 Specific program resources for the patients

- ☀ Kindergarten instructional materials: inter-locking pieces, shoes, balls, balloons, food, animals, clothing accesories, tools, bathroom and kitchen accesories, coins, clock, stickers...
- ☀ Patient's individual folders: folder of activity sheets; memory of life book.
- ☀ Whiteboards

5.3 Activity sheets

Each activity goes with a sheet designed to such effect. It will be used as (1) a way for the experimenter to know the specifics and characteristics of the task at hand, (2) instructions for the patient to know about the task, although the task is done with different materials, and (3) materials to carry out the task. An example of the activities to carry out is the one shown on Table 5. The essential elements of the table are the weekly distribution with a thematic specified area (for instance, week 1, *The Family*) and the specified level of difficulty according to the assigned group (GDS 4 or GDS 5). As technical information, the *intervention area* in which the sheet is included is detailed, as well as the *specific pressing content*, the *title of the activity* and finally the *specific competences and processes* intervened.



WEEK: 1 THEME: Family		DIFFICULTY LEVEL (MARK X): X GDS 4 (SIMPLE) <input type="checkbox"/> GDS 4 (COMPLEX) <input type="checkbox"/> GDS 5 (SIMPLE) <input type="checkbox"/> GDS 5 (COMPLEX)										
ÁREA: 	CONTENT: Motivation and positive emotion	ACTIVITY TITLE: WHO AM I?	COMPETENCES : 1.1; 1.2; 3.5; 4.4; 6.1; 6.2									
1. MY NAME IS: _____ 2. I'M FROM: _____ 3. I'M _____ 4. WE TAKE A PICTURE. WE STICK IT HERE: _____ 5. WHAT I'D MOST LIKE TO DO IS: _____ 6. I WANT YOU TO CALL ME: _____ 7. I WANT TO SAY SOMETHING ELSE: _____												
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Necessary materials: Picture camera and printer.												
Table 5. Activity sheet prototype.												

6. ICAPD effectiveness control: methodological mechanisms

The essential objective of the Integral Cognitive Action Program in Dementias (IPACD) is to keep in the most efficient way possible the cognitive and behavioral abilities of the patient that already has cognitive impairment. But this objective can only be achieved if



if it's an intervention program supported by proved levels of effectiveness through basic cognitive investigation. This way, it's essential to accompany this program with the adequate methodological mechanisms to assess the degree of achievement of the aforementioned objectives.

The design to achieve such objective it's regulated, on one side, by the own features of the patients (essentially his degree of impairment/decline), the temporary nature of their stay in the Center (entry date), the staying term and the length of the intervention itself (estimated on six months). On the other side, it's limited by the human resources necessary to apply the intervention program and its assessment, and, finally, by the special necessity to count on the adequate comparative groups to check the intervention effectiveness and the variable control that can affect the results (parallel interventions not included in ICAPD)

With all the considerations displayed and taking into account that the patients can enter simultaneously or (predictably in the future) step by step or in an individual way, with previous reports regarding the initial assessment of their impairment, the sequence would go as follows:

- 1. Assessment of impairment level in his own Center**
- 2. Patient Classification in homogeneous groups of moderate and mild impairment.**
- 3. Random allocation of patients to control and experimental groups.**
- 4. Intervention Program (ICAPD)**
 - a. Implementation
 - b. Continuing record of the action fields
- 5. Evaluation:**
 - a. To the control group
 - ☀ Retest of the valuation process
 - ☀ Valuation of the specific ICAPD tests:
 - Motivation and positive emotion
 - Breathing
 - Perception and attention
 - Learning and Memory
 - Thought and Language



- Autobiography and relaxation
 - b. Of the experimental group: Retest of the valuation process
6. **Data analysis**
7. **Conclusions about effectiveness:**
- a. Of ICAPD (globally and of each intervention area)
 - b. Of the commitment in the facility
 - c. Of the difference between the commitment and the ICAPD

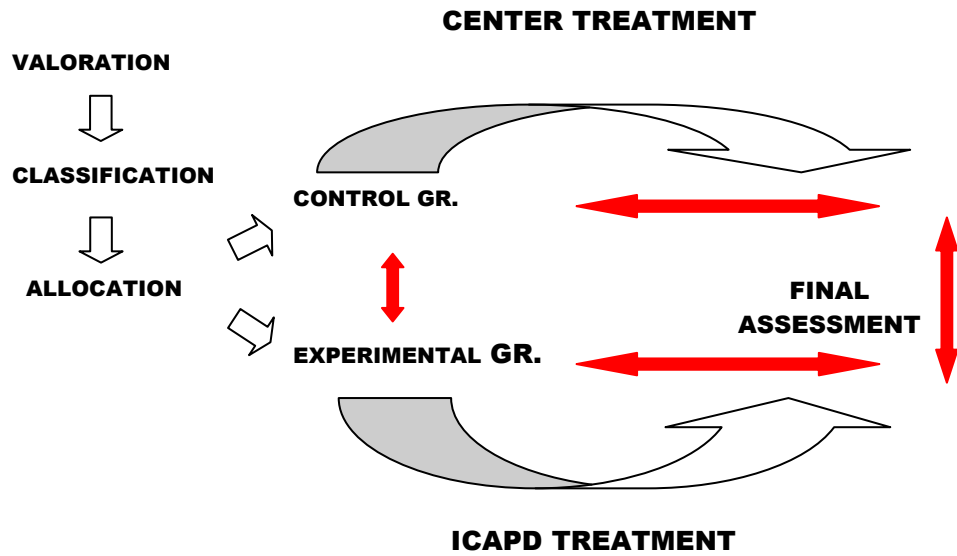


Figure 9. Diagram of the experimental design
(comparison groups are marked in red)

7. Cognitive assessment

The objective of cognitive assessment inside ICAPD doesn't imply looking for a dementia diagnosis, since it's considered it was previously established, so typical neuropsychological evaluation tools won't be used. It is, on the contrary, a wider neuropsychological evaluation, specific and focused on the different interesting cognitive processes, directed towards the knowledge preserved cognitive processes, lost processes, altered processes as well as the type and alteration degree of these last group. Nor is it an aim to assess all the cognitive processes the intervention has been implemented over: only the essential ones for a proper cognitive and emotional processing, and those necessary for a proper maintenance of the quality of life.



The evaluation sequence must follow the next considerations:

Evaluation time: the group of tests done during the evaluation have an estimated time of three hours per patient. The great individual variability found in practice must be taken into account, considering there have been cases in which the evaluation time has been very low in the event of tests in which the patient didn't collaborate or the task was too demanding for the subject, or longer times when execution is successful is successful but demanding for the patient.

Distribution of evaluation times: Each person assessed has had at least three one-hour sessions. The principle of functionality and organization of the center must come first, taking into account the minimum trips necessary for the patients and the internal organization of the auxiliary staff, as well as the lunch times of the patients.

The tests aim to outline the cognitive situation of the patient. For this reason, these tests can be replaced by other ones that define their cognitive execution. In our case, the tests used to determine ICAPD's effectiveness are shown on Table 5. Likewise, we'll use the execution on different cards that are used by the intervention program repeatedly to check the evolution of the program.

<i>TESTS</i>	Tiempo	Assessed fields
FIRST DAY		
MEDICAL HISTORY	10 MN	2.1 Healthy habits
MINIMENTAL STATE EXAMINATION	10 MN	Global
BENTON'S VISUAL RETENTION TEST	15 MN	3.1 Visual Perception 4.1 Episodic Memory 5.5 Motor Programs
HISTORY OF BABCOCK (IMMEDIATE)	05 MN	4.1 Episodic Memory 4.2 Memory
ISAACS' TEST	05 MN	5.13 Semantic Verbal Fluency 4.2 Semantic Memory 5.18 Phonological Fluency 5.4 Phon. Verbal Fluency
VOCABULARY TEST (WAISS)	10 MN	4.2 Semantic Memory 5.12 Denomination
HISTORY OF BABCOCK (DELAYED)	05 MN	4.1 Episodic Memory 4.2 Semantic Memory 4.9 LTM Retrieval
SECOND DAY		



REMOTE MEMORY	05 MN	4.9 MLT Recovery 4.10 Remote Memory
PROSPECTIVE MEMORY COMPUTERIZED TEST	30 MN	4.5 Prospective Memory 3.9 Divided attention 5.1 Executive function 5.2 Work memory 3.6 Orientation change 1.1. Motivation 1.3. Volition
WISCONSIN'S CARD CLASSIFICATION TEST	25 MN	5.1 Executive function 5.2. WorkMemory 5.4. Space-time control
THIRD DAY		
WESCHLER'S MEMORY SCALE	60 MN	4.1 Episodic Memory 4.2. Semantic Memory 4.3. Procedural Memory 4.7. STM Codification 4.9. LTM Retrieval 4.10 Remote Memory
ANOSOGNOSIA SCALE (Burns et al., 1999) NIHM'S MOOD SCALE (Dmas de Burns, 1999)	05 MN 05 MN	1.4 Anosognosia 5.7 Emotional control
CANCELATION TEST TRAIL MAKING TEST CAN STROOP'S TEST (LEZAC, 2004)	10 MN	3.7 Selective attention 3.8 Concentration
LANGUAGE SURVEY ON DEMENTIAS (Cuetos et al. (2007)	15 MN	5.10 a 5.18 Language

Table 6. Development of evaluation process.

8. Information Management

Intervention with elders, specially ill persons, it's always delicate. It must follow an essential set of patterns that allow to develop intervention without any unexpected problems. A lot of these guidelines are driven by common sense, but with elders, the meticulous compliance with them it's a lot more important that with any other population segment. That's, among other reasons, because they are patients advanced in years with whom, consequently, it's difficult to use pressure as a mean to adjust them to the situation. Therefore, the starting point must always be respecting the patient's wishes when doing the stimulation program. Even if they seem obvious, we have to take into account, essentially, the following questions

- ☀ *When:* The moment must be absolutely adapted to the patient's needs. Nothing else must interfere with the schedule because anxiety and intrusive



thoughts will void any effectiveness the intervention could have.

- ☀ *Where:* It must be done in a neutral and completely quiet place.
- ☀ *Who:* The person who's doing the intervention must be good-natured and empathic; very socially adapted both in behavior and in clothing. There can always be a patient that could get bothered by behavior that's not appropriate for the patient's age. In addition, he or she must be an specialized monitor, trained and supervised by a neuropsychology professional.
- ☀ *How long:* Stimulation overload must be avoided. Sessions must be light and relaxed, with more than enough time to complete the planned activities. For that purpose, they must be cognitively intense, but short.
- ☀ *How Many:* The monitor/patient ratio must be of 1 monitor for each 5 patients. A lesser ratio blocks the adequate patient attention. A greater monitor number could create anxiety and the feeling of pressure on the patients by the amount of unknown people with them.
- ☀ *Which:* Groups must be as homogeneous as possible. The pre-evaluation must be used to make similar groups by their attention needs and intervention. The number of each group mustn't exceed 12 patients (the number will be lower or higher depending on the degree of decline).
- ☀ *How:*
 - Respect and kindness must the tone of the intervention. None other behavior is permitted given that it would impact negatively on the intervention. Under no circumstances disagree with the patient. Reformulating is better than arguing.
 - Keeping communication at all times with all the patients. The patient that loses communication or visual contact will lose the session.
 - Structured. Following a very clear script that prevents confusion. Improvisation with elders it's specially difficult due to the necessity to adapt to his comprehension level.



Avoid multitasking. The lack of structure creates anxiety and annoyance (even aggressiveness) on patients with dementia.

- Structured. All the program must follow routines that prepare the patient to what he's going to do in order to calm them. Newness isn't good for them. Routine is better than a surprise that might turn unpleasant for them.
- Simple and to the point: Avoid ambiguity. Instructions must be very clear and adjusted to the patient's abilities. Control at any time the difficulty index. Bear in mind the possibility adapting tasks for those patients that might require to do them in a simpler way.
- Bear in mind at every moment the preserved abilities of the patients. They will guide the ways the tasks can be reformulated.
- To protect and respect at all times the patient's independence as well as his social and personal intimacy
- To provide a relaxed and enjoyable atmosphere.



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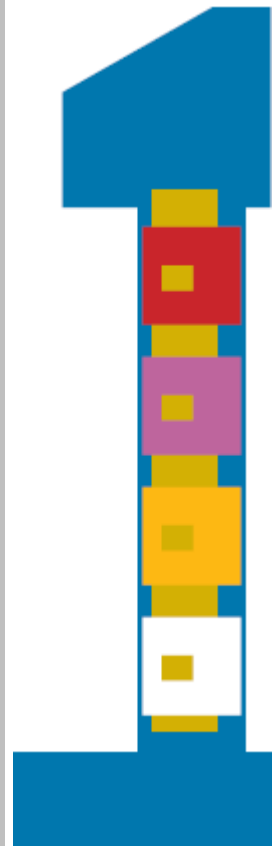
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INDEX OF ACTIVITY CARDS



10. INDEX OF ACTIVITY CARDS

Area 1- Motivation and Emotion

CARD NUMBER: 101		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: WHO AM I?	COMPETENCES : 1.1; 1.2; 3.5; 4.4; 6.1; 6.2 ALLOTED TIME: 15 MN

CARD NUMBER: 102		DIFFICULTY LEVEL : MEDIUM	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FACE PUZZLE 1	COMPETENCES : 1.1; 3.1; 3.8; 5.2; 5.8; 5.13; ALLOTED TIME: 15 MN

CARD NUMBER: 103		DIFFICULTY LEVEL : HIGH	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FACE PUZZLES 2	COMPETENCES : 1.1; 3.1; 3.8; 5.2; 5.8; 5.13; ALLOTED TIME: 15 MN

CARD NUMBER: 104		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FACE PUZZLES 3	COMPETENCES : 1.1; 3.1; 3.8; 5.2; 5.8; 5.13; ALLOTED TIME: 15 MN

CARD NUMBER: 105		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FACE PUZZLES 4	COMPETENCES : 1.1; 3.1; 3.8; 5.2; 5.8; 5.13; ALLOTED TIME: 15 MN

CARD NUMBER: 106		DIFFICULTY LEVEL : DEPENDING ON PUZZLE PIECE NUMBER	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FACE PUZZLES 5	COMPETENCES : 1.1; 3.1; 3.8; 5.2; 5.8; 5.13; ALLOTED TIME: 15 MN

CARD NUMBER: 107		DIFFICULTY LEVEL: LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: HISTORY OF THE CHOCOLATE CAKE	COMPETENCES : 1.1; 3.7; 4.1; 4.7; 5.6; 5.16; 6.1; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 108		DIFFICULTY LEVEL: LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: CARDS TO MAKE A PARTY	COMPETENCES : 1.1; 1.3; 2.1; 4.5; 5.6; 6.3; 6.4 ALLOTED TIME: 15 MN



CARD NUMBER: 109		DIFFICULTY LEVEL : MEDIUM	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FOOD CLASSIFICATION BY CATEGORIES 1	COMPETENCES : 1.1; 1.3; 2.1; 4.3; 4.5; 6.3; 6.4 ALLOTED TIME: 15 MN

CARD NUMBER: 110		DIFFICULTY LEVEL : MEDIUM	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FOOD CLASSIFICATION BY CATEGORIES 2	COMPETENCES : 1.1; 1.3; 2.1; 4.3; 4.5; 6.3; 6.4 ALLOTED TIME: 15 MN

CARD NUMBER: 111		DIFFICULTY LEVEL : MEDIUM	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: FOOD CLASSIFICATION BY CATEGORIES 3	COMPETENCES : 1.1; 1.3; 2.1; 4.3; 4.5; 6.3; 6.4 ALLOTED TIME: 15 MN

CARD NUMBER: 112		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: SEMANTIC INHIBITORY CONTROL. MY BEARD HAS THREE HAIRS.	COMPETENCES : 1.1; 1.3; 2.1; 4.3; 4.5; 5.6; 6.4 ALLOTED TIME: 15 MN

CARD NUMBER: 113		DIFFICULTY LEVEL : X GDS 5 (SIMPLE)	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 114		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 2	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 115		DIFFICULTY LEVEL :LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 3	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 116		DIFFICULTY LEVEL :LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 4	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN



CARD NUMBER: 117		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 5	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 118		DIFFICULTY LEVEL :LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 6	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 119		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 7	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN

CARD NUMBER: 120		DIFFICULTY LEVEL : LOW	
AREA: 1	CONTENT: Motivation and positive feeling	ACTIVITY TITLE: RIDDLE HUNT WITH SEMANTIC AND/OR PHONOLOGIC CLUE 8	COMPETENCES : 1.1; 4.2; 5.2; 5.1; 5.4; 6.4; ALLOTED TIME: 15 MN



AREA 2- Breathing and Aerobic Therapy

CARD NUMBER: 201		DIFFICULTY LEVEL : LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: WALKING TEST 1	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER:202.		DIFFICULTY LEVEL: LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: WALKING TEST 2	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 203		DIFFICULTY LEVEL : LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: ASTRAND AND RIHMING TEST	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 204		DIFFICULTY LEVEL: LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: ASTRAND AND RIHMING TEST 2	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 205		DIFFICULTY LEVEL: LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 206		DIFFICULTY LEVEL: LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 1	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 207		DIFFICULTY LEVEL: LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 2	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 208		DIFFICULTY LEVEL: MEDIUM	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 3	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN

CARD NUMBER: 209		DIFFICULTY LEVEL: MEDIUM	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 4	COMPETENCES : 1.1; 2.2; 2.3 ALLOTTED TIME: 10 MN



CARD NUMBER: 210		DIFFICULTY LEVEL: LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 2	COMPETENCES : 1.1; 2.2; 2.3 ALLOTED TIME: 10 MN

CARD NUMBER: 211		DIFFICULTY LEVEL : LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 3	COMPETENCES : 1.1; 2.2; 2.3 ALLOTED TIME: 10 MN

CARD NUMBER: 212		DIFFICULTY LEVEL : LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 4	COMPETENCES : 1.1; 2.2; 2.3 ALLOTED TIME: 10 MN

CARD NUMBER: 213.		DIFFICULTY LEVEL : LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: UPPER LIMBS STRENGTH 5	COMPETENCES : 1.1; 2.2; 2.3 ALLOTED TIME: 10 MN

CARD NUMBER: 214		DIFFICULTY LEVEL : LOW	
AREA: 2	CONTENT: Aerobic resistance	ACTIVITY TITLE: PHYSICAL ACTIVITY	COMPETENCES : 1.1; 2.2; 2.3 ALLOTED TIME: 10 MN



AREA 3. PERCEPTION AND ATTENTION

CARD NUMBER: 301		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE RECOGNITION 1	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 302		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE RECOGNITION 2	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 303		DIFFICULTY LEVEL : LOW	
AREA : 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE RECOGNITION 3	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 304		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE RECOGNITION 4	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 305		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE RECOGNITION 5	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 306.A&B		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: MAINTAINED ATTENTION 1. PARTS A & B.	COMPETENCES : 3.1; 3.7; 3.8; 5.3;

CARD NUMBER: 307		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: MAINTAINED ATTENTION. 2.	COMPETENCES : 3.1; 3.7; 3.8; 5.3;

CARD NUMBER: 308		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE DIFERENCIATION 1	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 309		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE DIFERENCIATION 2	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;



CARD NUMBER: 310		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE DIFERENCIATION 3	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5

CARD NUMBER: 311		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: FEATURE DIFERENCIATION 4	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 312		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: MAINTAINED ATTENTION. 3	COMPETENCES : 3.1; 3.7; 3.8; 5.3;

CARD NUMBER: 313		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Concentration	ACTIVITY TITLE: HERWIG TEST. DIGIT SEQUENCE 1	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 314		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Concentration	ACTIVITY TITLE: HERWIG TEST. DIGIT SEQUENCE 2	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 315		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: WRITING- READING ATTENTION	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;

CARD NUMBER: 316		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: WRITING- READING ATTENTION 2	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;

CARD NUMBER: 317		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: PERSONALITY RECOGNITION 1	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 318		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: PERSONALITY RECOGNITION 2	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;



CARD NUMBER: 319		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: PERSONALITY RECOGNITION 1	COMPETENCES : 3.1; 3.7; 3.8; 5.3; 5.5;

CARD NUMBER: 320		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TECO 1	COMPETENCES : 3.1; 3.6; 3.5; 3.8; 5.2; 5.5; 5.10;

CARD NUMBER: 321		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TECO 2	COMPETENCES : 3.1; 3.6; 3.5; 3.8; 5.2; 5.5; 5.10;

CARD NUMBER: 322		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TECO 3	COMPETENCES : 3.1; 3.6; 3.5; 3.8; 5.2; 5.5; 5.10;

CARD NUMBER: 323		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TECO 4	COMPETENCES : 3.1; 3.6; 3.5; 3.8; 5.2; 5.5; 5.10;

CARD NUMBER: 324		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TECO 5	COMPETENCES : 3.1; 3.6; 3.5; 3.8; 5.2; 5.5; 5.10;

CARD NUMBER: 325.		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TECO 6	COMPETENCES : 3.1; 3.6; 3.5; 3.8; 5.2; 5.5; 5.10;

CARD NUMBER: 326		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TESSEL 1	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 327		DIFFICULTY LEVEL : X GDS 4 (SIMPLE)	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TESSEL 2	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;



CARD NUMBER:328		DIFFICULTY LEVEL : X GDS 4 (SIMPLE)	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TESSEL 3	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 329		DIFFICULTY LEVEL : X GDS 4 (SIMPLE)	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TESSEL 4	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 330		DIFFICULTY LEVEL : X GDS 4 (SIMPLE)	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TESSEL 5	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 331		DIFFICULTY LEVEL : X GDS 4 (SIMPLE)	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: TESSEL 6	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 332		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES TEST 1	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 7 – 9 – 8 – 8 -

CARD NUMBER: 333		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 2	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 8 – 21 – 20 – 4 -

CARD NUMBER:334		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 3	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 21 – 9 – 17 - 12

CARD NUMBER: 335		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 4	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 23 – 13 – 26 – 8 -

CARD NUMBER: 336		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 5	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 9 – 13 – 20 – 10 -



CARD NUMBER: 337		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 6	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 13 – 17 – 9 – 21 -

CARD NUMBER:338		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 7	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 32 – 15 -7 - 20

CARD NUMBER: 339		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 8	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 8 – 5 – 29 – 12 -

CARD NUMBER:340		DIFFICULTY LEVEL :HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 9	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 10 -19 -13 -28 -

CARD NUMBER:341		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: SEARCHING APPEARANCES 10	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5; RESULTS: 34 – 24 – 18 -12 -

CARD NUMBER: 342		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Face control	ACTIVITY TITLE: YELA TEST	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 343		DIFFICULTY LEVEL : MEDIUM	
AREA: 3	CONTENT: Attentional control	ACTIVITY TITLE: STROOP. COUNTING WORDS	COMPETENCES : 3.1; 3.6; 3.7; 3.8; 5.2; 5.5;

CARD NUMBER: 344		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: SEARCH OF META LETTER 1	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;

CARD NUMBER: 345		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: SEARCH OF META LETTER 2	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;



CARD NUMBER: 346		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: OBJECT OBSERVATION 1	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;

CARD NUMBER: 347		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: OBJECT OBSERVATION 2	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;

CARD NUMBER: 348		DIFFICULTY LEVEL : HIGH	
AREA: 3	CONTENT: Selective attention	ACTIVITY TITLE: OBJECT OBSERVATION 3	COMPETENCES : 3.1; 3.7; 3.8; 5.1; 5.3; 5.14;



AREA 4. LEARNING AND MEMORY

CARD NUMBER: 4.01		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: DIGIT WORK MEMORY	COMPETENCES : 4.7; 5.2; 3.5 ALLOTED TIME: 5 MN

CARD NUMBER: 402		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: DIGIT WORK MEMORY	COMPETENCES : 4.7; 5.2; 3.5 ALLOTED TIME: 5 MN

CARD NUMBER: 403		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: FACE RECOGNITION MEMORY 1	COMPETENCES : 4.1; 4.2; 4.9; 3.1 ALLOTED TIME: 30 SEC. RECOVERY 30 MN.

CARD NUMBER: 404		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: FACE RECOGNITION MEMORY 2	COMPETENCES : 4.1; 4.2; 4.9; 3.1 ALLOTED TIME: 30 SEC. RECOVERY 30 MN

CARD NUMBER: 4.05		DIFFICULTY LEVEL : HIGH	
AREA: 4	CONTENT: Prospective Memory	ACTIVITY TITLE: OBJECT RECALLING	COMPETENCES : 4.1; 4.2; 4.9; 4.3; 4.5; ALLOTED TIME: 30 SEC. RECOVERY 20 MN

CARD NUMBER: 406		DIFFICULTY LEVEL : HIGH	
AREA: 4	CONTENT: Prospective Memory	ACTIVITY TITLE: DATE RECALLING	COMPETENCES : 4.1; 4.2; 4.9; 4.3; 4.5; ALLOTED TIME: 30 SEG. RECOVERY 20 MN

CARD NUMBER: 407		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Recognition Memory	ACTIVITY TITLE: DRAWING RECOGNITION MEMORY	COMPETENCES : 4.1; 4.2; 4.9; 3.1; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 408		DIFFICULTY LEVEL : HIGH	
AREA: 4	CONTENT: Short Term Memory	ACTIVITY TITLE: MEMORY FREE OF TEXTS	COMPETENCES : 4.1; 4.2; 4.7; 4.9 ALLOTED TIME: 5 MN



CARD NUMBER: 409		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Recognition Memory	ACTIVITY TITLE: FACE RECOGNITION MEMORY	COMPETENCES : 4.1; 4.2; 4.9; 3.1; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 410		DIFFICULTY LEVEL : HIGH	
AREA: 4	CONTENT: Motor Memory	ACTIVITY TITLE: ITINERARY MEMORY	COMPETENCES : 4.1; 4.3; 4.7; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 411		DIFFICULTY LEVEL : HIGH	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: DIGIT MEMORY 3	COMPETENCES : 4.7; 5.2; 3.5 ALLOTED TIME: 5 MN

CARD NUMBER: 412		DIFFICULTY LEVEL : HIGH	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: DIGIT MEMORY 4	COMPETENCES : 4.7; 5.2; 3.5 ALLOTED TIME: 5 MN

CARD NUMBER: 413		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Long Term Memory	ACTIVITY TITLE: FREE TEXT MEMORY (LETTER)	COMPETENCES : 4.1; 4.2; 4.7; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 414		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Long Term Memory	ACTIVITY TITLE: FREE TEXT MEMORY (LETTER)	COMPETENCES : 4.1; 4.2; 4.7; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 4.15		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Long Term Memory	ACTIVITY TITLE: FREE TEXT MEMORY (LETTER)	COMPETENCES : 4.1; 4.2; 4.7; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 416		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Long Term Memory	ACTIVITY TITLE: FREE TEXT MEMORY (LETTER)	COMPETENCES : 4.1; 4.2; 4.7; 4.9 ALLOTED TIME: 5 MN

CARD NUMBER: 417		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: RECOVERY WORD FREE OF WORDS	COMPETENCES : 4.2; 4.7 ALLOTED TIME: 30 SEC. RECOVERY 10 MN.



CARD NUMBER: 418		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: RECOVERY WORD FREE OF WORDS 2	COMPETENCES : 4.2; 4.7 ALLOTED TIME: 30 SEC. RECOVERY 10 MN.

CARD NUMBER: 419		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: RECOVERY WORD FREE OF WORDS 3	COMPETENCES : 4.2; 4.7 ALLOTED TIME: 30 SEC. RECOVERY 10 MN.

CARD NUMBER: 420		DIFFICULTY LEVEL : MEDIUM	
AREA: 4	CONTENT: Learning and Memory	ACTIVITY TITLE: RECOVERY WORD FREE OF WORDS 4	COMPETENCES : 4.2; 4.7 ALLOTED TIME: 30 SEC. RECOVERY 10 MN.



AREA 5. LANGUAGE AND THOUGHT

CARD NUMBER: 501		DIFFICULTY LEVEL: MEDIUM	
AREA: 5	CONTENT: Space-time control	ACTIVITY TITLE: FINDING THE HAND 1	COMPETENCES : 3.1; 3.8; 5.3

CARD NUMBER: 502		DIFFICULTY LEVEL : MEDIUM	
AREA: 5	CONTENT: Space-time control	ACTIVITY TITLE: FINDING THE HAND 2	COMPETENCES : 3.1; 3.8; 5.3

CARD NUMBER: 503		DIFFICULTY LEVEL : MEDIUM	
AREA: 5	CONTENT: Space-time control	ACTIVITY TITLE: FINDING THE HAND 3	COMPETENCES : 3.1; 3.8; 5.3

CARD NUMBER: 504		DIFFICULTY LEVEL : LOW	
AREA: 5	CONTENT: Space-time control	ACTIVITY TITLE: CONNECT SYMBOLS WITH THEIR NAME AND FUNCTION	COMPETENCES : 3.1; 3.8; 5.3

CARD NUMBER: 505		DIFFICULTY LEVEL : MEDIUM	
AREA: 5	CONTENT: Space-time control	ACTIVITY TITLE: LATERAL THOUGHT: LOGIC QUESTIONS 1	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 506		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Lateral thought	ACTIVITY TITLE: LATERAL THOUGHT. LOGIC QUESTIONS 2	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 507		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Lateral thought	ACTIVITY TITLE: COIN TEST	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 508		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Logic thought	ACTIVITY TITLE: COMPLETE GROUPS 1	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 509		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Logic thought	ACTIVITY TITLE: COMPLETE GROUPS 2	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;



CARD NUMBER:510		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Logic thought	ACTIVITY TITLE: ABSTRASCT REASONING THOUGHT 1	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 511		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Logic thought	ACTIVITY TITLE: ABSTRACT REASONING THOUGHT 2	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 512		DIFFICULTY LEVEL : HIGH	
AREA: 5	CONTENT: Logic thought	ACTIVITY TITLE: ABSTRACT REASONING THOUGHT 3	COMPETENCES : 5.1; 5.2; 5.7; 5.8; 5.11;

CARD NUMBER: 513		DIFFICULTY LEVEL : LOW	
AREA: 5	CONTENT: INITIAL LURIA Executive functions.	ACTIVITY TITLE: MANUAL MOBILITY 1	COMPETENCES : 5.1; 5.5

CARD NUMBER: 514		DIFFICULTY LEVEL : LOW	
AREA: 5	CONTENT: INITIAL LURIA Executive functions. .	ACTIVITY TITLE: MANUAL MOBILITY 2	COMPETENCES : 5.1; 5.5

CARD NUMBER: 515		DIFFICULTY LEVEL : LOW	
AREA: 5	CONTENT: INITIAL LURIA Executive functions. .	ACTIVITY TITLE: RIGHT-LEFT ORIENTATION 1	COMPETENCES : 5.1; 5.5

CARD NUMBER: 516		DIFFICULTY LEVEL : LOW	
AREA: 5	CONTENT: INITIAL LURIA Executive functions. .	ACTIVITY TITLE: RIGHT-LEFT ORIENTATION 2	COMPETENCES : 5.1; 5.5

CARD NUMBER: 517		DIFFICULTY LEVEL : MEDIO	
AREA: 3	CONTENT: Operational Memory	ACTIVITY TITLE: VISUAL MANAGEMENT	COMPETENCES : 5.2; 3.1; 4.7 ALLOTTED TIME: 5 MN

CARD NUMBER: 518		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Verbal Fluency	ACTIVITY TITLE: NUMERIC AND PHONOLOGIC	COMPETENCES : 5.1; 5.2; 5.4; 5.13; 5.18 ALLOTTED TIME: 5 MN



CARD NUMBER: 519		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Verbal Fluency	ACTIVITY TITLE: PHONOLOGIC AND SEMANTIC 1	COMPETENCES : 5.1; 5.2; 5.4; 5.13; 5.18 ALLOTED TIME: 5 MN

CARD NUMBER: 520		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Verbal Fluency	ACTIVITY TITLE: PHONOLOGIC AND SEMANTIC 2	COMPETENCES : 5.1; 5.2; 5.4; 5.13; 5.18 ALLOTED TIME: 5 MN

CARD NUMBER: 521		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Verbal Fluency	ACTIVITY TITLE: PHONOLOGIC AND SEMANTIC 3	COMPETENCES : 5.1; 5.2; 5.4; 5.13; 5.18 ALLOTED TIME: 5 MN

CARD NUMBER: 522		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Series Control	ACTIVITY TITLE: PSYCHOMOTOR ACTIVITY AND CONTROL 1	COMPETENCES : 5.1; 5.2; 5.3.; 5.5; 5.14 ALLOTED TIME: 5 MN

CARD NUMBER: 523		DIFFICULTY LEVEL : MEDIO	
AREA: 3	CONTENT: Series Control	ACTIVITY TITLE: PSYCHOMOTOR ACTIVITY AND CONTROL 2	COMPETENCES : 5.1; 5.2; 5.3.; 5.5; 5.14 ALLOTED TIME: 5 MN

CARD NUMBER: 524		DIFFICULTY LEVEL : MEDIO	
AREA: 3	CONTENT: Series Control	ACTIVITY TITLE: PSYCHOMOTOR ACTIVITY AND CONTROL 3	COMPETENCES : 5.1; 5.2; 5.3.; 5.5; 5.14 ALLOTED TIME: 5 MN

CARD NUMBER: 525		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Series Control	ACTIVITY TITLE: PSYCHOMOTOR ACTIVITY AND CONTROL 4	COMPETENCES : 5.1; 5.2; 5.3.; 5.5; 5.14 ALLOTED TIME: 5 MN

CARD NUMBER: 526		DIFFICULTY LEVEL : LOW	
AREA: 3	CONTENT: Series Control	ACTIVITY TITLE: PSYCHOMOTOR ACTIVITY AND CONTROL5	COMPETENCES : 5.1; 5.2; 5.3.; 5.5; 5.14 ALLOTED TIME: 5 MN

