



13th March 2024

COGNITIVE AND SENSORIAL ACCESSIBILITY **KEY DESIGN APPROACHES**



Co-funded by
the European Union



Cognitive and Sensorial Accessibility and Key Design Approaches

Ms Berta Brusilovsky Filer

MODEL FOR THE DESIGN

Presented by Mrs. Berta Brusilovsky

COGNITIVE ACCESSIBILITY : SPACES THAT TALK TO PEOPLE

Presented by Mrs. Berta Brusilovsky



COME IN TO A SECURE
INCLUSIVE PLACE

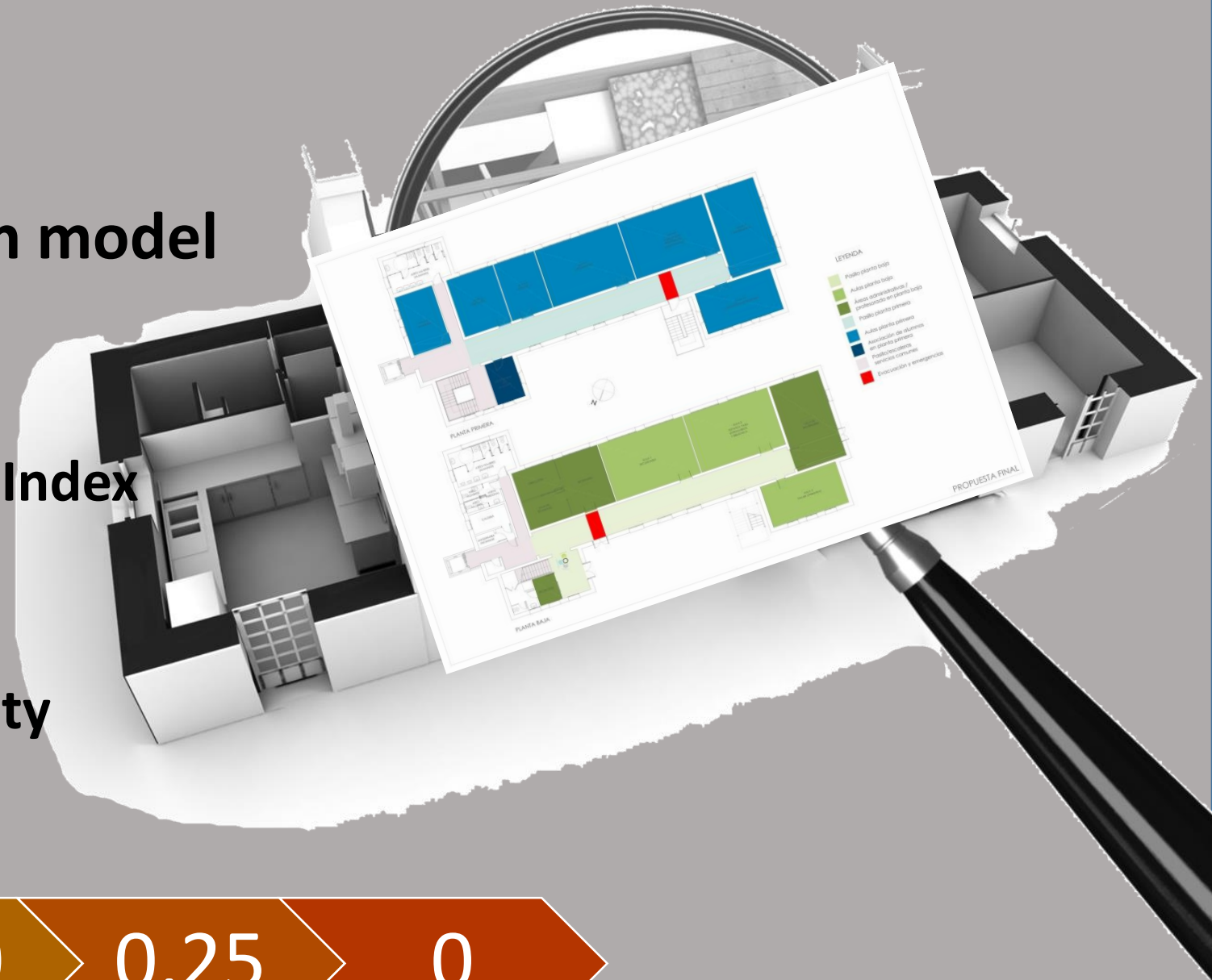
COGNITIVE ACCESSIBILITY

- Cognitive accessibility in the habitat
- Design and adaption of spaces around the person
- Space system support



INTRODUCTION

- The Cognitive Spectrum model
 - Design
 - Cognitive Accessibility Index
 - Indicators of Cognitive Accessibility



INDEX

1

0,75

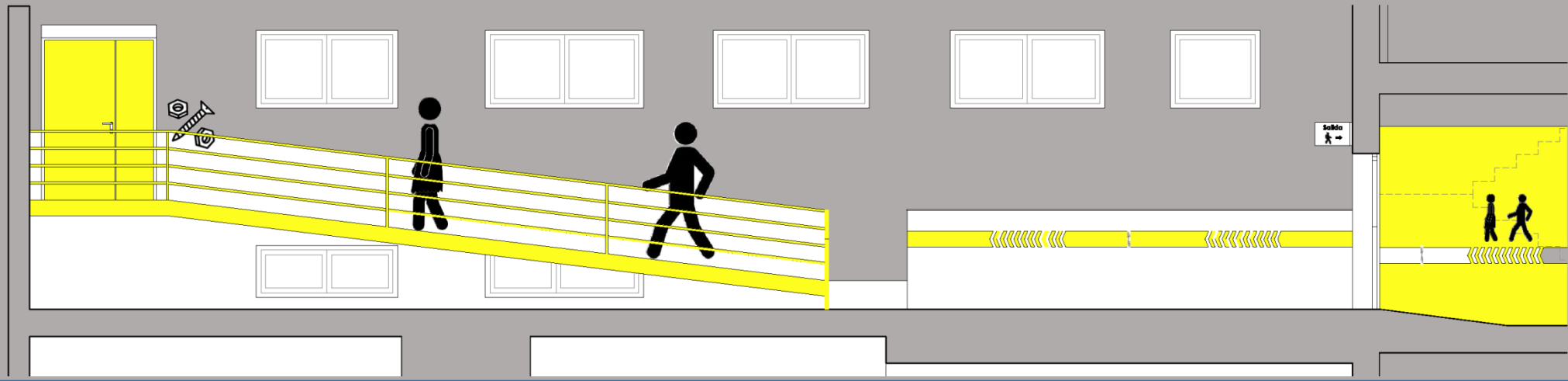
0,50

0,25

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INTRODUCTION

- **Space becomes a support system**
when improve
 - **Movility**
 - **Orientation**
 - **Autonomy**
 - **Diversity of cognitive spectrum**
types
 - **Intellectual and TEA**
 - **Elderly**
 - **Space orientation dificulties**



OBJECTIVES

General Objective: Cognitive space security

- Better life and autonomy through better orientation and performance
- Public and private uses

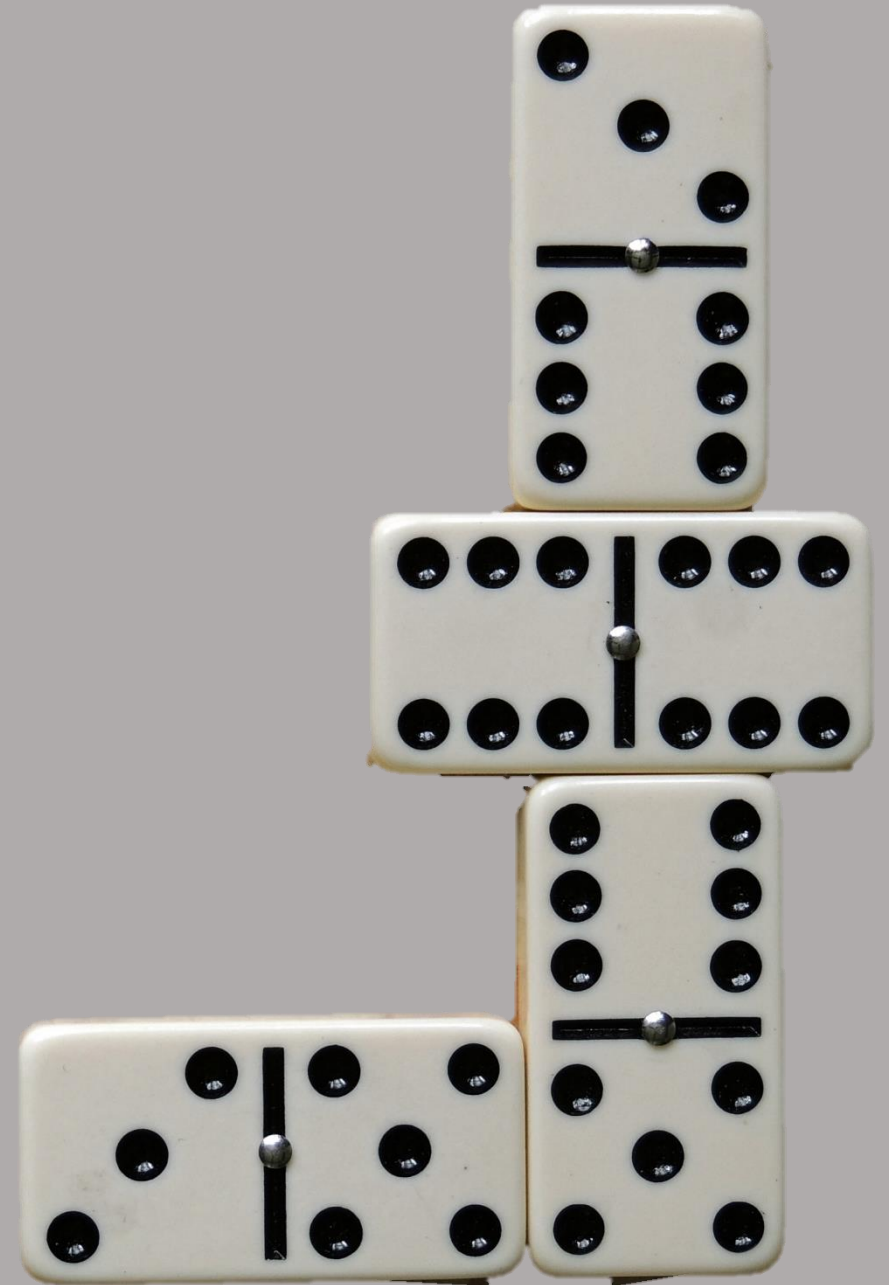


Persona
caminando
autónoma
en calle,
metro, o
edificio

OBJECTIVES

Specific Objective: **Sequential system of support**

- Space topological organisation: order, continuity, contiguity, separation and zoning.
- Spaces that talk to people.
- Space design (support system) prior to graphic elements, symbols and texts.



MODEL STRUCTURE

COGNITIVE ACCESSIBILITY MODEL

Theoretical Model

Practical
application

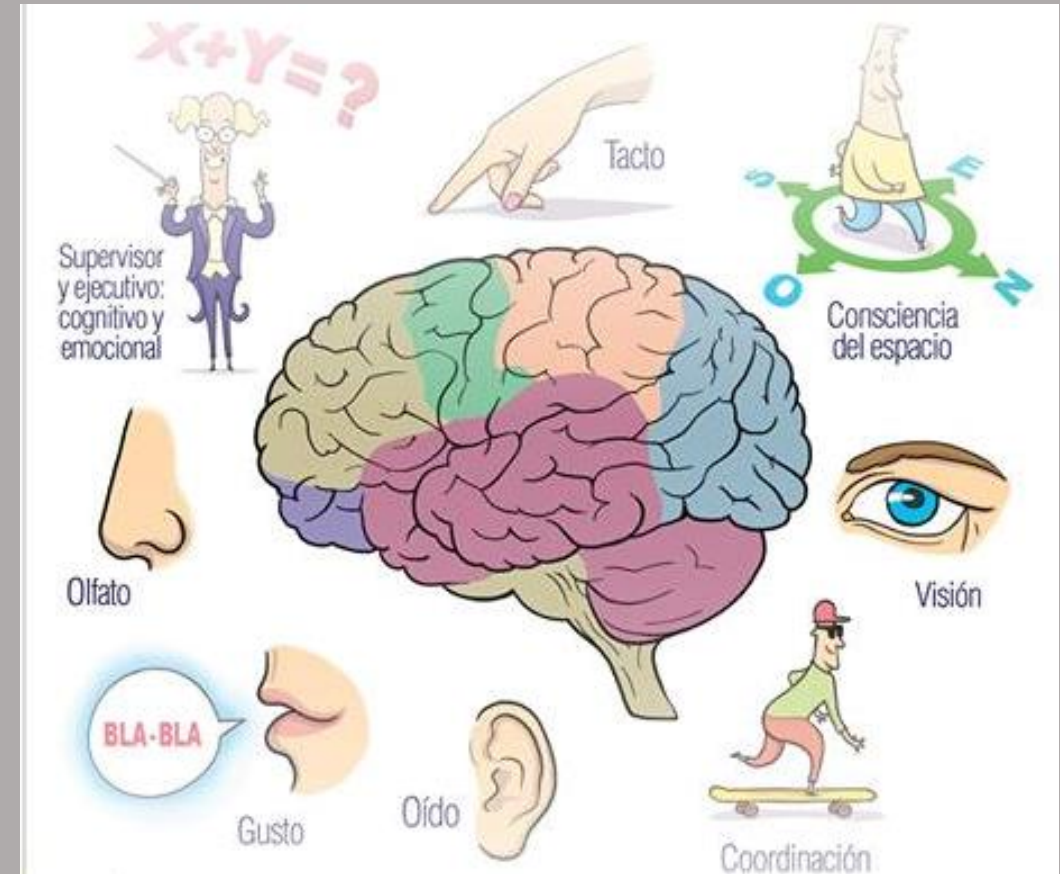
Principles

Design Components
And INDEX

Participatory
Methodology with
users

THEORETICAL MODEL

- Architectural and urban paradigms through time
- Perception, cognition; the cerebral GPS and cognitive functioning; orientation, information; improve memories, etc.
- Attention systems: how the mind acts among locution, visual effects and memory.
- Role of visual perceptions: forms and dimensions, semantic, colours, illumination, distances, etc.



PARTICIPATORY METHODOLOGY

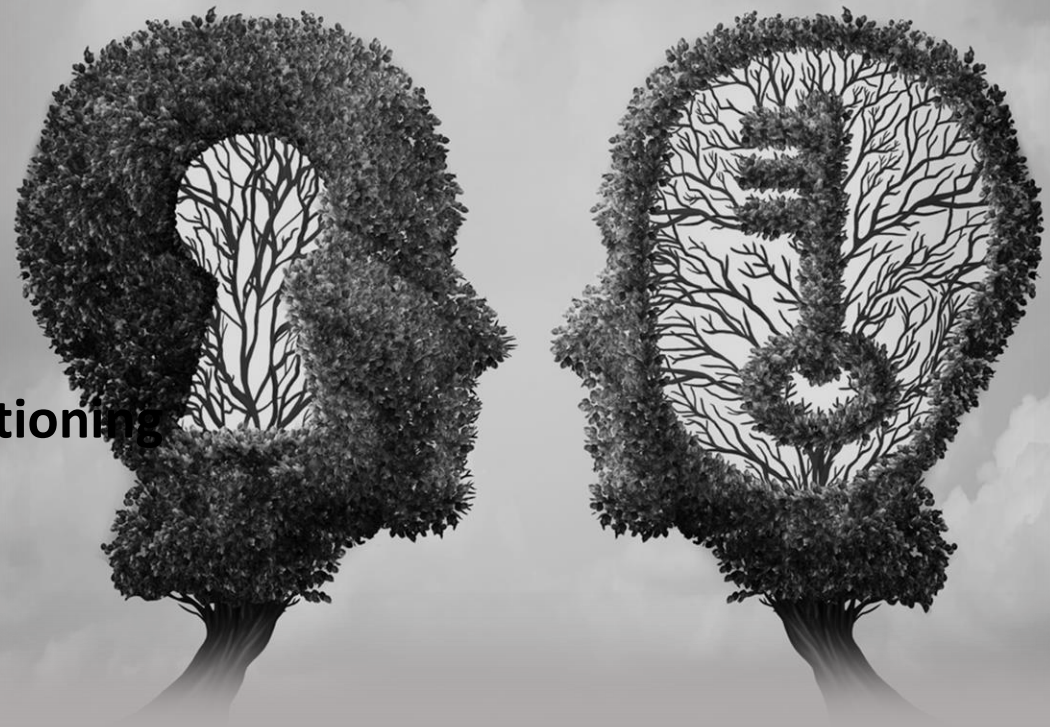
Continuous adaption of the model in search of understandable concepts.



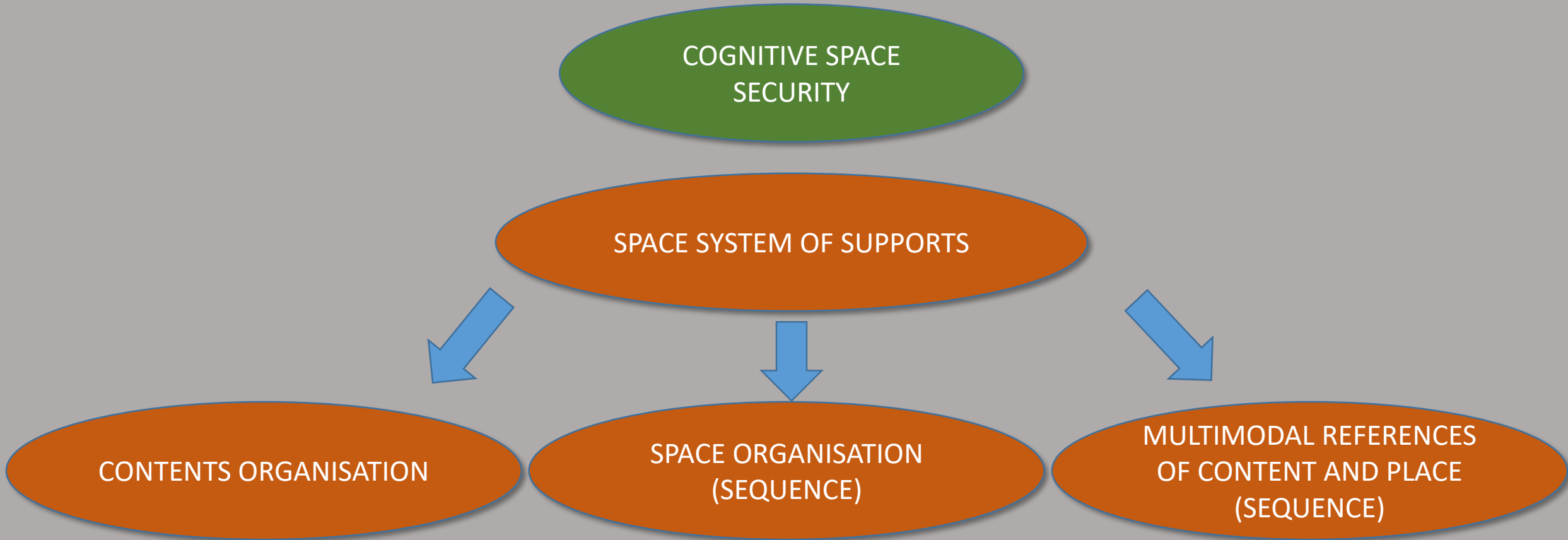
WHAT IS NECESSARY TO SOLVE?

- **The Cognitive space insecurity**

- The labyrinth effect
- Crossroads
- Absence of focused centres
- Excess of messages
- Absence of multisensorial references
- Random (aleatorio) and arbitrary positioning of references



HOW TO SOLVE THESE PROBLEMS

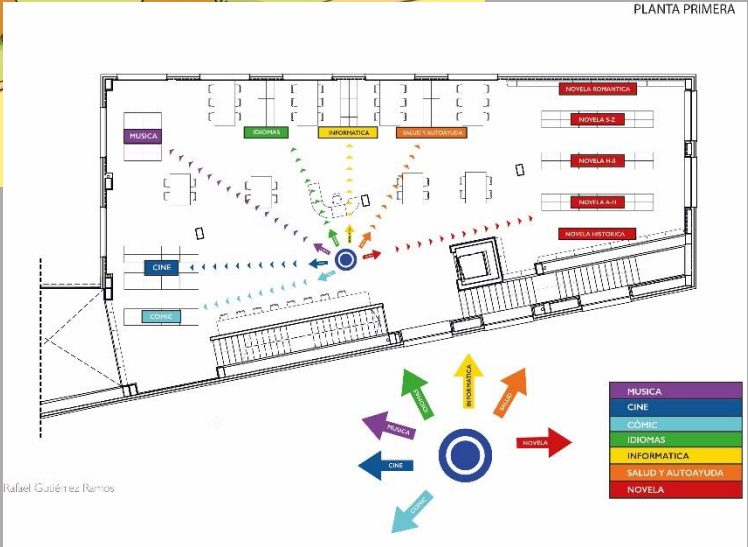
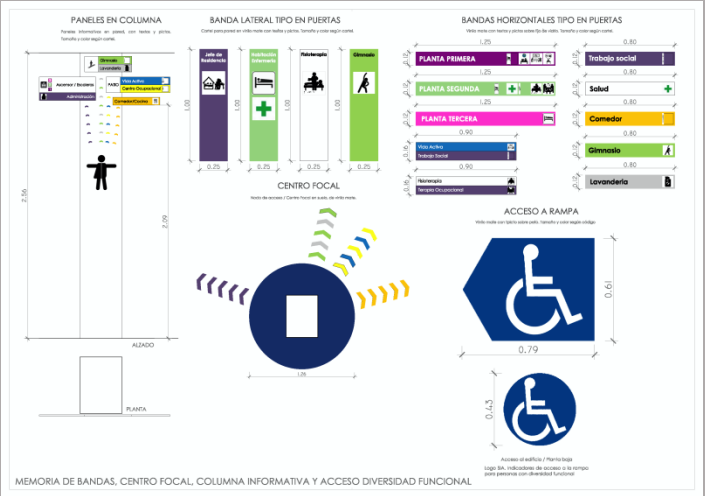
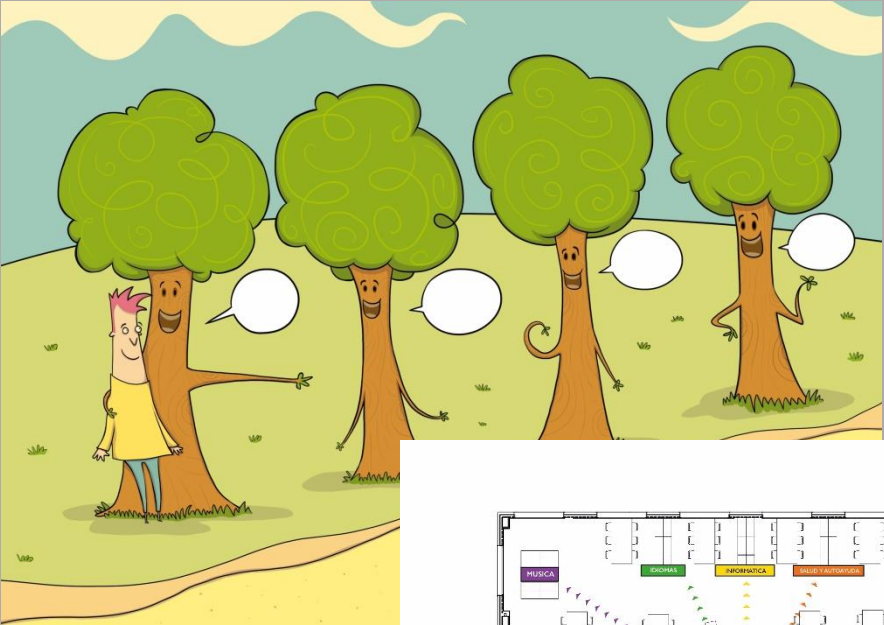


DESIGN ACCORDING TO THE PRINCIPLES AND COMPONENTS OF THE MODEL

Cognitive Accessibility Indicators

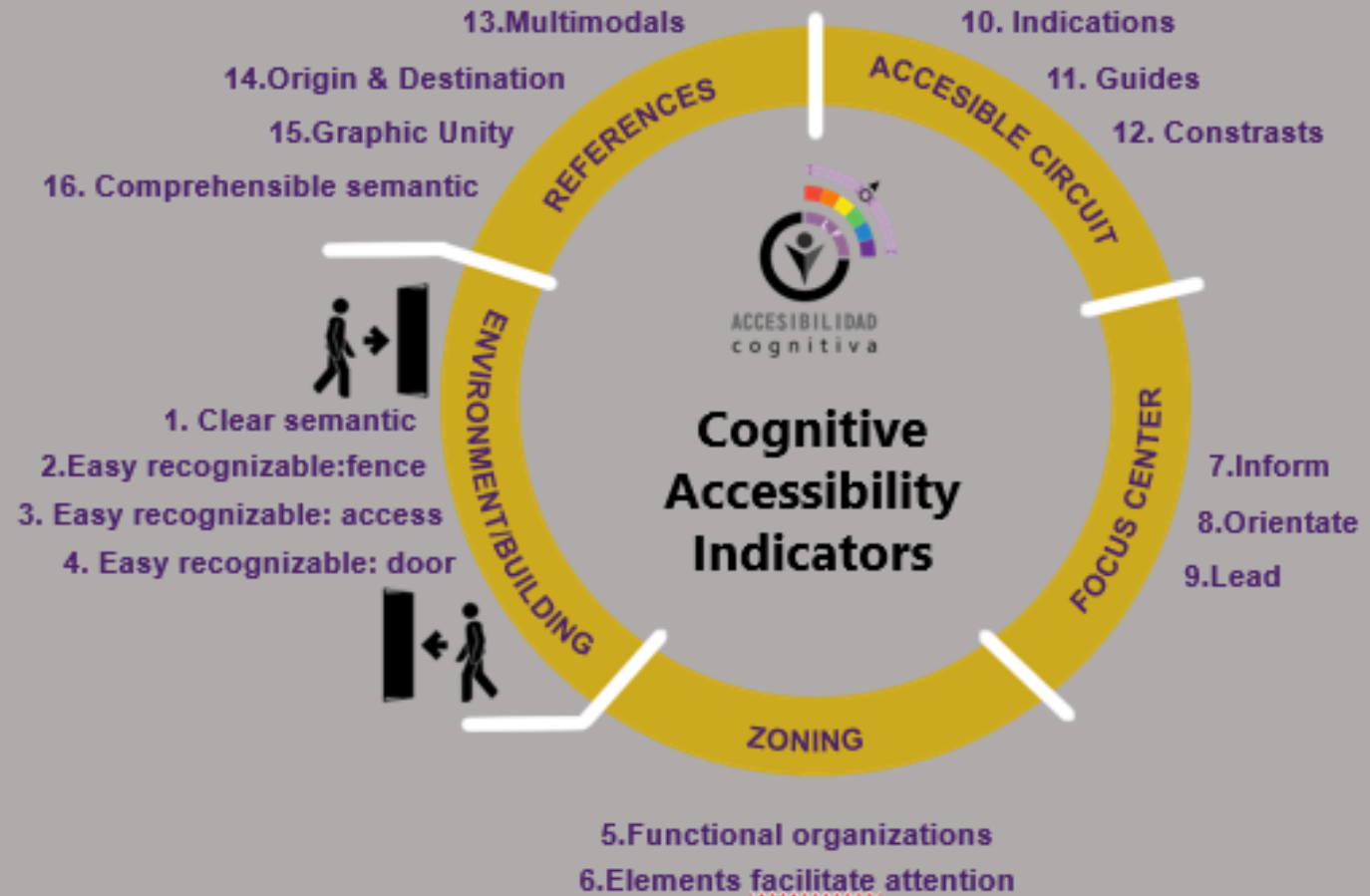
HOW TO SOLVE THESE PROBLEMS

Cognitive Accessibility Indicators



HOW TO SOLVE THESE PROBLEMS

Cognitive Accessibility Indicators



INTRODUCTION SENSORIAL AND COGNITIVE ACCESSIBILITY



BACKGROUND

WHY?

SENSORY AND COGNITIVE ACCESSIBILITY + NEUROSCIENCE

REDUCE HIGH RISK CONDITIONS FOR DISORIENTATION

CASES

- Difficulties perceiving the relative location of objects in relation to oneself.
- Direction disorientation: defined as the inability to represent the direction of the point where you want to go.
- Disorientation due to inability to orient yourself based on surrounding reference points. Need clear coordinates.
- **Topographic amnesia:** Disorientation that refers to the inability to learn and remember topographic relationships between reference points. It will hardly be autonomous.



REDUCE HIGH RISK CONDITIONS CAUSED BY HIGH SENSORY SENSITIVITY

CASES

- People who become upset when there is sensory overload, generally visual and auditory.
- Emotional overload is created that slows down reactions and makes motor activities difficult.

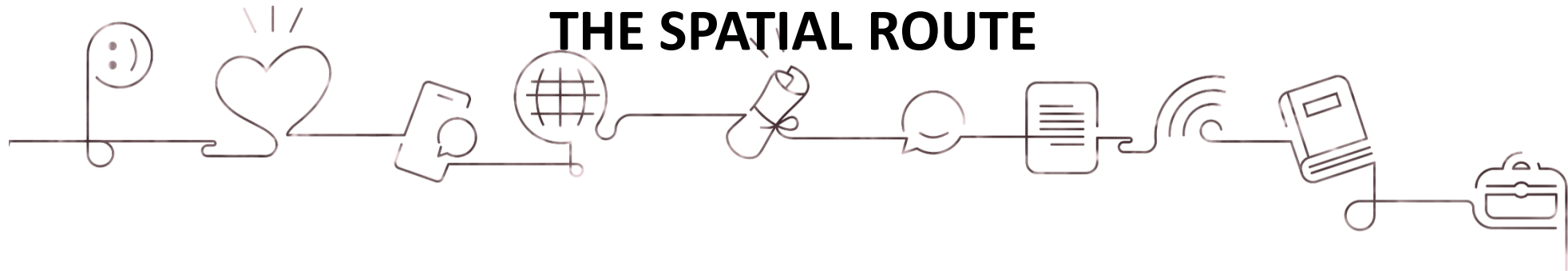


1- BACKGROUND

HOW DO PEOPLE RELATE TO THE ENVIRONMENT AND TO THE BUILDINGS?

There are five possibilities or five “routes” that are:
Sensory, perceptive, cognitive and emotional.

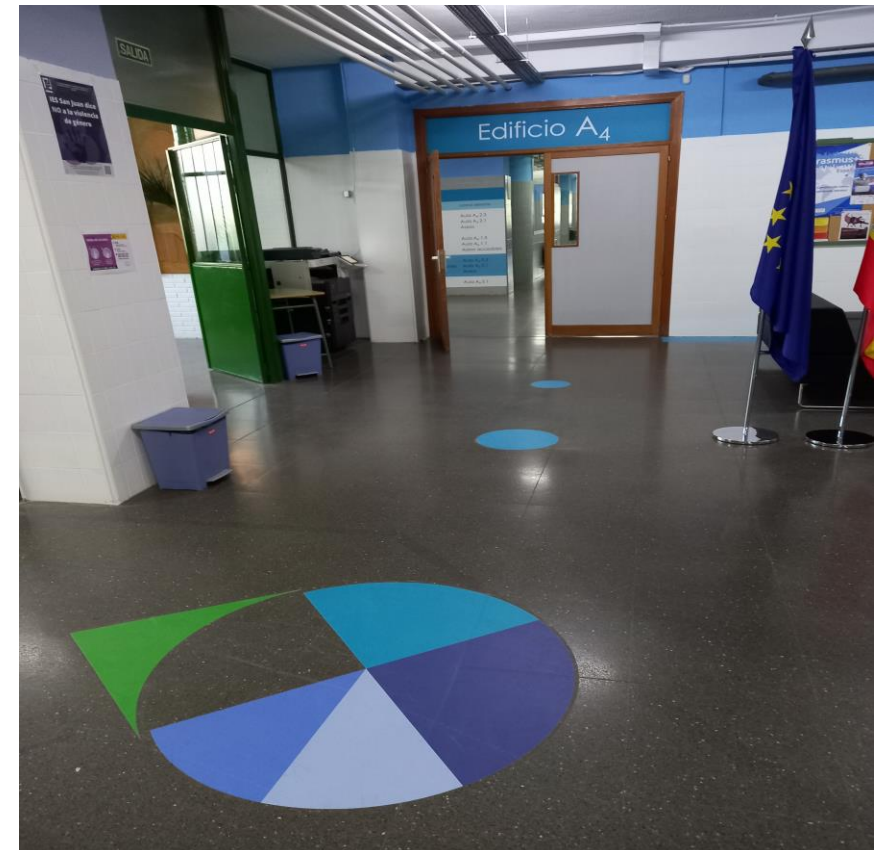
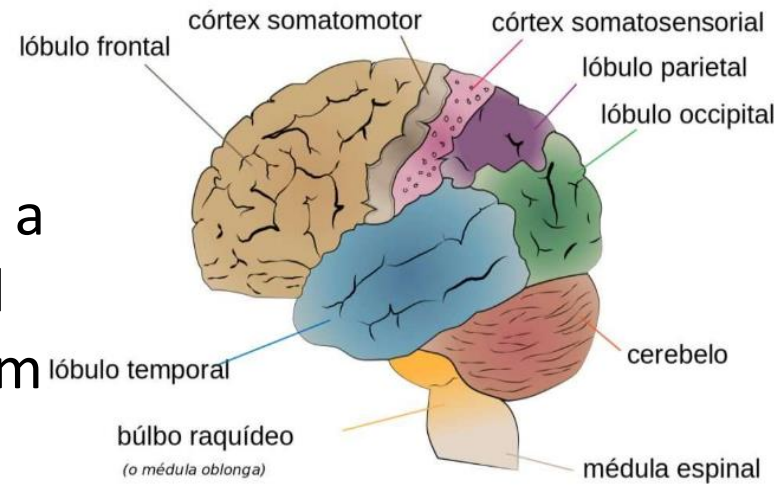
But there is another case ***through actions***, and this is only experienced with environments and architecture :



ROUTES IN THE BRAIN

To orient ourselves, take a direction, reach a destination and socialize, there are several routes that **our brain** can take to carry them out and they happen **in different brain regions**:

- **Spatial route**, it is the space, the architecture that guides and directs with its concepts of organization, shapes, colors, relationships (**occipital and parietal lobe**)
- **Lexical or written route** (also sounds), it is the word that guides and directs (**temporal and occipital lobes**)
- **Graphic route**: it is the graphic material or the signs that guide or direct (**parietal and occipital lobes**)
- **Symbol path**: numeric symbol (**temporary twist, temporal lobe**)
- **The Insula** in the humans, belongs to the **limbic system**, associated among other things, **to memory**
- **limbic systems**: associated **to emotions**.



ARCHITECTURE AS SUPPORT: IS A SET OF SPATIAL COORDINATES

The **spatial path** is like a *set of spatial coordinates* represented by the elements or structural and functional parts of the architecture.

1: first think and plan,

2: then design,

3: and finally build, for the development of human activities (functional and sensorial).

4: It is architecture **fulfilling the functions of guiding, orienting, leading, anticipating and facilitating people's lives.**

RUTAS DE ACCESO



RUTA ESPACIAL: PROYECTO

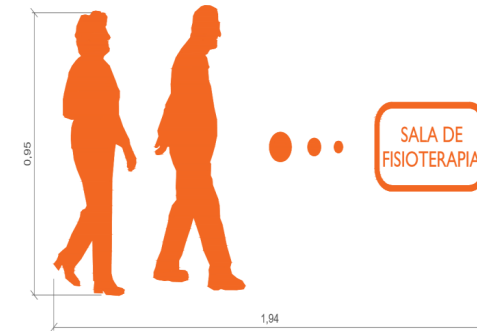


TO COMPLEMENT THE SPATIAL UNDERSTANDING

What happens if the design of the building does not fulfill these functions of orienting, directing, facilitating, that is, it does not act as a set of spatial coordinates?



U VINILO DE CONTINUIDAD ACCESO A SALA DE FISIOTERAPIA



T VINILO DE CONTINUIDAD ACCESO A SALA DE FISIOTERAPIA



LEXICAL ROUTE: THE WORDS, THE SOUND(WORDS)

We should complement the spatial route with **Spoken or written** elements. And with symbols (numbers) too.

Or **we must** when exist rules about them (Braille).



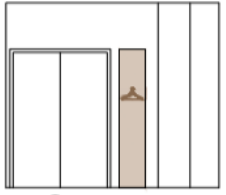
GRÁPHIC ROUTE

To overcome the difficulties of reception and perception of the oral or lexical route, text reading has been replaced by images: that reproduce objects, subjects, spaces, processes, both for learning daily tasks and to identify what is of interest, to perform an action or communicate with the environment.

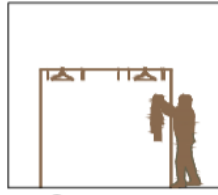


GRAPHIC ROUTE: GO, GO OUT, PUT, PUT INSIDE...

Activities and actions

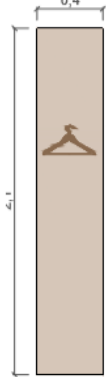


② VINILO INDICADOR DE PERCHERO

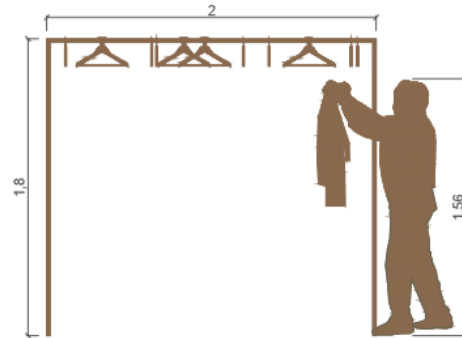


③ VINILO DE PERCHERO

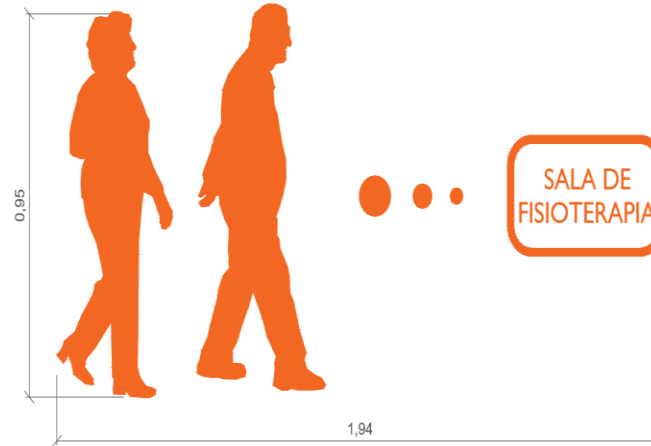
② VINILO INDICADOR DE PERCHERO



③ VINILO DE PERCHERO



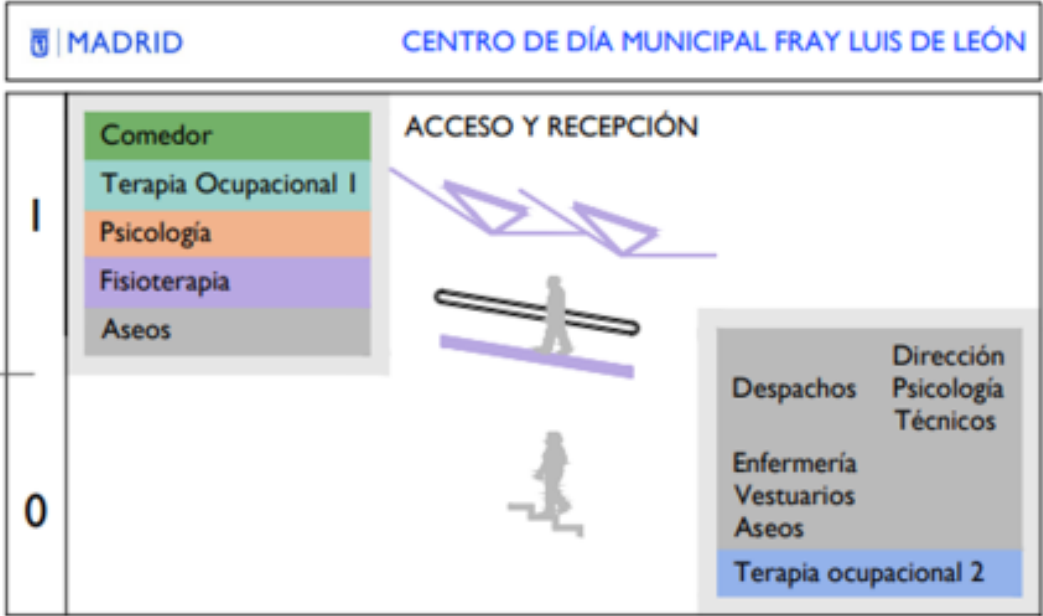
U VINILO DE CONTINUIDAD ACCESO A SALA DE FISIOTERAPIA



T VINILO DE CONTINUIDAD ACCESO A SALA DE FISIOTERAPIA



SPATIAL,
TEXT +
GRAPHIC
(panels)



PARTICULAR: TEA GRÁPHIC ROUTE

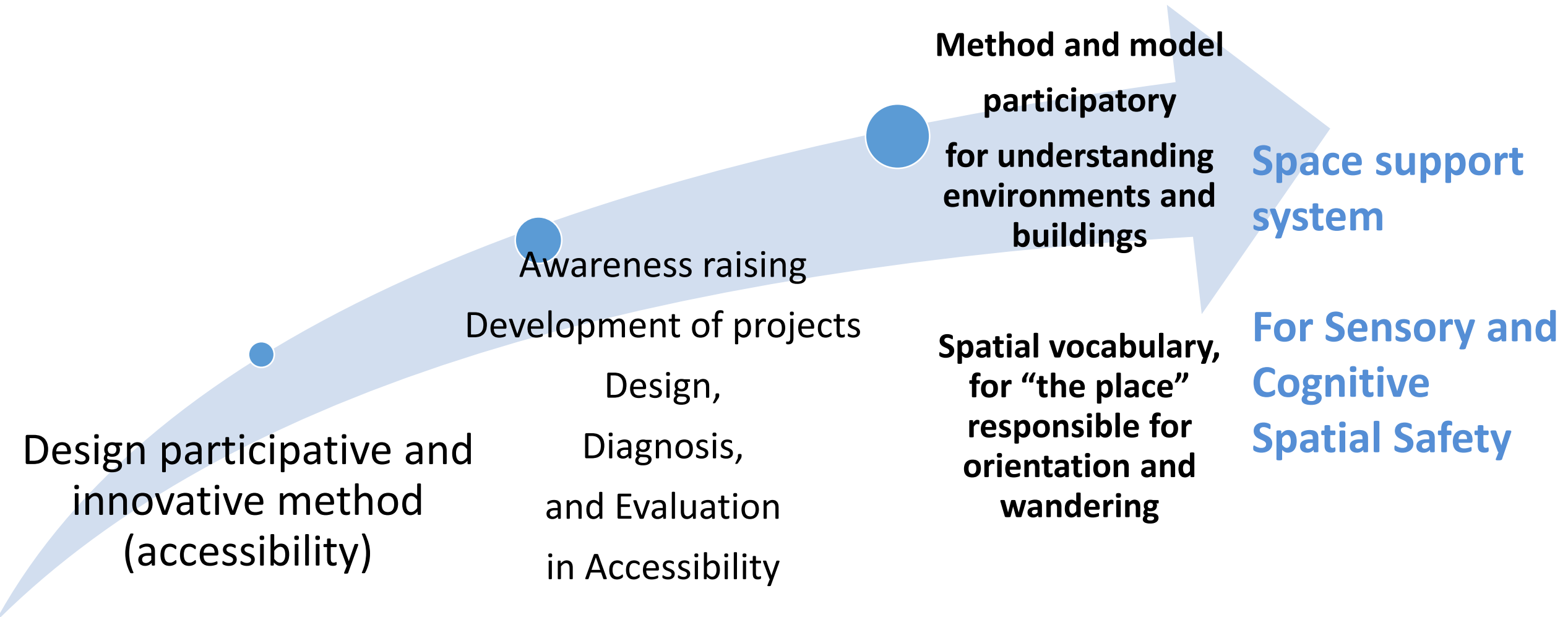
TEA are visual thinkers: they process images very well.

The image replaces verbal communication difficulties. In the visual structures there are highly specialized areas for the identification of light, color, shape, movement, etc. Regardless of the words.

Vision allows adaptation in a permanent perception-action cycle. Because we want them to be able to operate in space.



COGNITIVE ACCESSIBILITY?



WE HAVE TO ANSWER TO THESE QUESTIONS

The model:
Is guide and much
more...

To respond to
sensory and
cognitive
processing needs.
It is a spatial
support system



THE OBJETIVE



**ORIENT WITHIN A SET OF
SPACES**



**DIRECT TO AND
FROM DIFFERENT
PLACES**



**FACILITATE
COMMUNICATION

WITH ALL
COGNITIVE AND
SENSORY
ACTIVITIES AND
PEOPLE
(SOCIALIZE)**



RELATE PEOPLE



**WITH PEOPLE AND
OTHER ACTIVITIES**



THE SPACE SUPPORT SYSTEM
GOES FROM...



PRINCIPLES OR POSTULATES

1) UNIVERSAL AND 2) FOR DESIGN



COMPONENTS FOR DESIGN

ARCHITECTURE



INDICATORS

SENSORIAL AND COGNITIVE
INDEX

PRINCIPLES OR POSTULATES

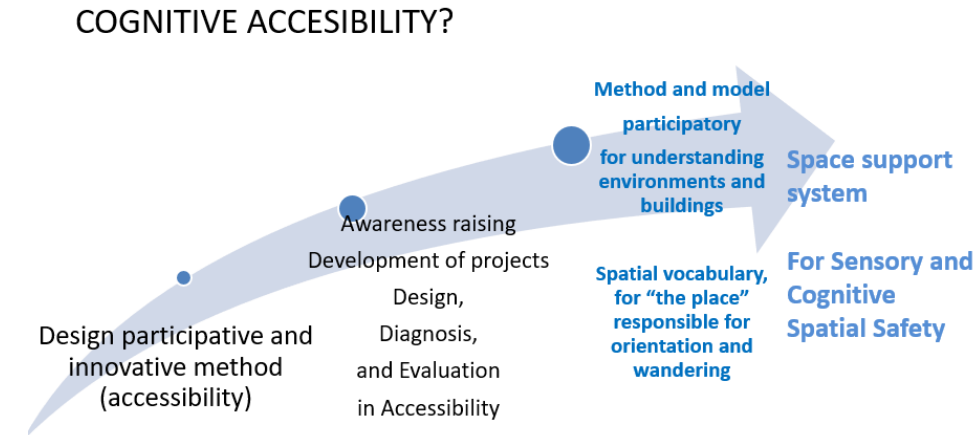
1. UNIVERSAL:

They are relationships that have a great influence on the state and behavior of people in space.

2. FOR DESIGN:

They contribute to the characterization of the components for design.

They are ***specific components for design*** with sensorial and cognitive accessibility.



1. UNIVERSALS

- Neutralize the labyrinth effect or internal confusion of the design, the main barrier to orientation in space: ***break the labyrinth effect.***
- Perfectly match encounters at spatial junctions and crossroads to avoid confusion and disorientation: ***break crossroads.***
- Eliminate design obstacles that prevent focusing attention (working on executive functions), memory, alertness, vigilance.
- Create references with easy texts, graphic signs and numerical symbols. Adapted **to each place.**
- Fracture-free sequencing of design components without creating crossroads in the structure. To avoid a collapse in executive functions: attentional and emotional: organization in functional and SENSORY sequences

UNIVE

- Neutr
del di:
el esp
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union
duplic
las en
- Elimir
la atei
vigilar
- Crear
y simk



1.a. UNIVERSALS

- Neutralize the labyrinth effect or internal confusion of the design, the main barrier to orientation in space: ***break the labyrinth effect.***

UNIVE

- Neutr
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1.b. UNIVERSALS

- Perfectly **match encounters at spatial crossroads (junctions)** to avoid confusion and disorientation: *break crossroads.*



1.c. UNIVERSALS

- **Eliminate design obstacles** that prevent focusing attention (working on executive functions), memory, alertness, vigilance.
- Create references with **easy texts, graphic**

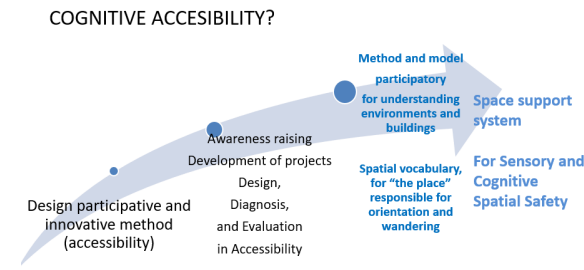


1.d. UNIVERSALS

- **Fracture-free sequencing of design components without creating crossroads (fractures) in the structure.**
- To avoid a **collapse in executive functions:** attentional and emotional: organization in functional and SENSORY sequences



2- FOR THE DESIGN



They fulfill structural functions:

- They are an important part of the design because they are formal, chromatic and perceptual structural organizers.
- Its result is architecture with a cognitive accessibility approach.
- Or cognitive accessibility with an architectural approach.

Create a limit effect in longitudinal spaces with markers or distances, to avoid visual and emotional alterations and **keep the information always present in memory.**

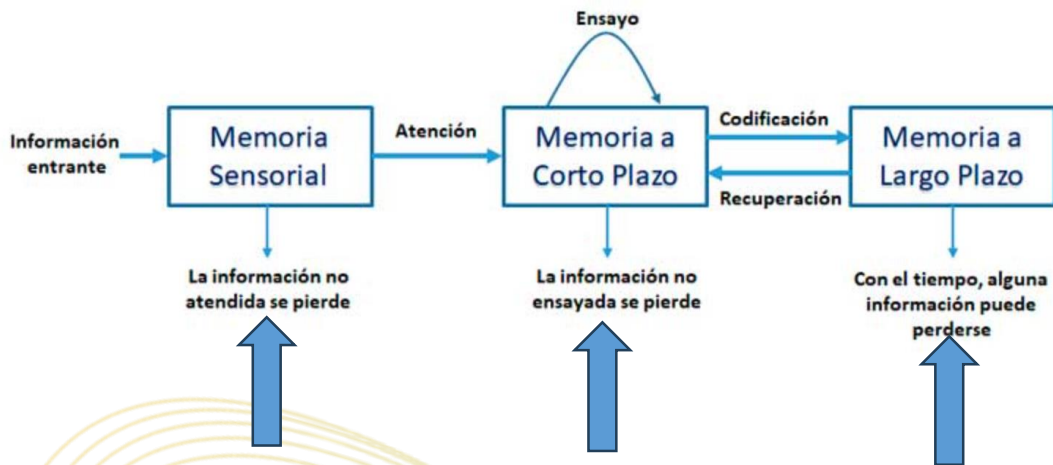
Markers that can be formal, visual, tactile, chromatic, sound.

Introduce important phenomena of visual perception, such as visual organizers. **Grouping-segregation effect and others**

Create references with the **semantics of the forms.** Although the design is the result of form-function-imagination-creativity, efforts will be made to ensure that the semantics of the forms are guiding).

2 aFOR THE DESIGN

Create *a limit effect* in longitudinal spaces: as *markers* to cause a boundary effect and the most important: *to maintain the information always present in the short or operative memory*



Information in memory: sensorial, short term, long term

2b FOR THE DESIGN

PERCEPTION'S PHENOMENON

CONTRASTS

Grouping-segregation effect important regulator of perception

RELATIONS

Figure-ground law:

In an image we tend to focus attention on one object (figure) highlighting it from the rest (background).

Law of good shape:

When we perceive we tend to reduce possible ambiguities or distorting effects, looking for the simplest way.

Laws of pregnancy and the grouping of stimuli

Law of proximity:

Allows you to relate and group different elements that are close to each other.

Law of similarity: relating and grouping similar elements.

Law of continuity:

Perceiving, as part of the same figure, elements that maintain continuity in form.



ARCHITECTURAL AND SIGNS VOCABULARY



2-FOR THE DESIGN



ARCHITECTURAL AND SIGNS VOCABULARY

- ***Grouping-segregation effect*** (and others)
as important perception regulators.



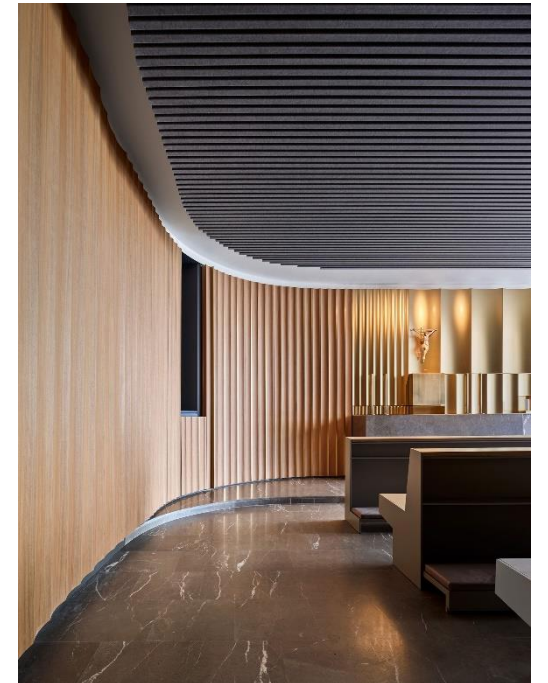
2c FOR THE DESIGN: VOLUMES AND SHAPES

Create references with shapes:

They facilitate concentration of attention and semantic memory.

Although the design is the result of form-function-
imagination-creativity, efforts will be made to ensure
that the semantics of the forms are guiding.

The forms express themselves and build their
communication vocabulary



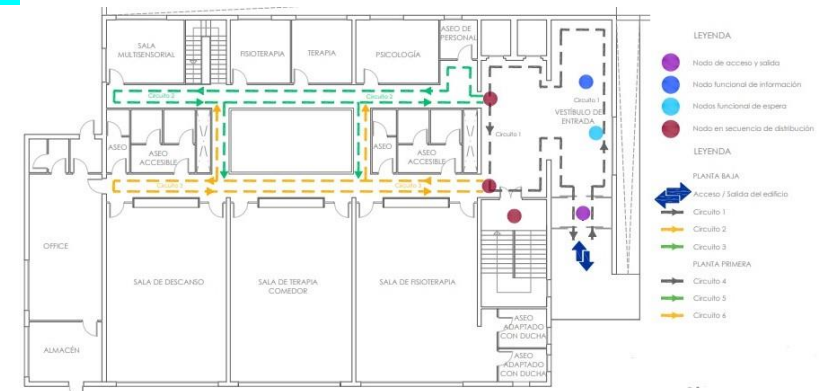
3. PRINCIPLES BECAMES DESIGN COORDENATES

The principles are processed, and we think:

- how can i convert this principles into spatial design elements?
- We transform them into design components
- A spatial vocabulary that facilitates behaviors in walking and wandering (looking for activities)

Architecture becomes a system of spatial coordinates to orient, guide, point out, protect, inform, anticipate, calm, and with its formal, functional and sensory aesthetics:

it speaks to people (architectural vocabulary)





Structure an organization:
Spatial relationships based on different localized activities:

BREAKING LABERINT EFFECT

Design focal centers as meeting places

BREAKING CROSSROAD EFFECT

SOLVED
Interior Roads, routes, or corridors

CHANGE DIMENTION EFFECT IN CIRCULATION CORRIDORS

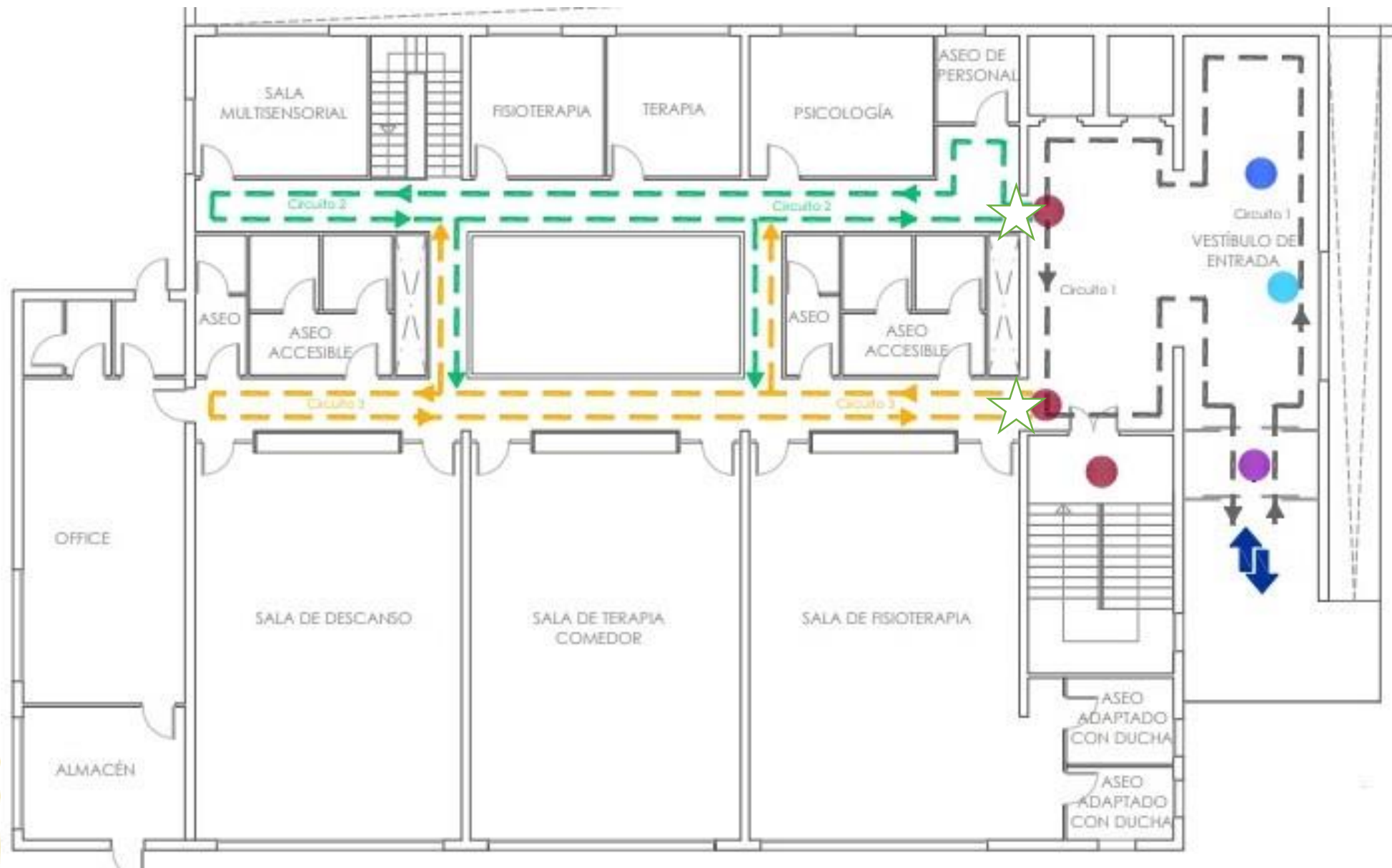
SOLVED
SINAPSIS SEW "FRACTURE EFFECT"

SOLVED
SENSORY SEQUENCES (gradation). Putting what happen BEFORE AND WILL BE AFTER





DESIGN

Volumes, shapes and colors to sort out (classified) functional and sensory ACTIVITIES

NATURAL AND ARTIFITIAL LIGHT



LEYENDA

-  Nodo de acceso y salida
-  Nodo funcional de información
-  Nodos funcional de espera
-  Nodo en secuencia de distribución

LEYENDA

PLANTA BAJA

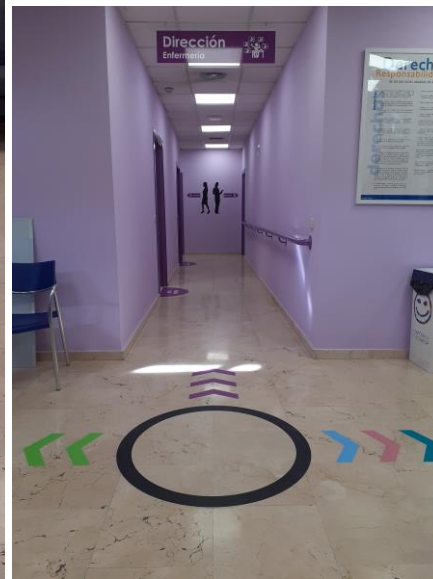
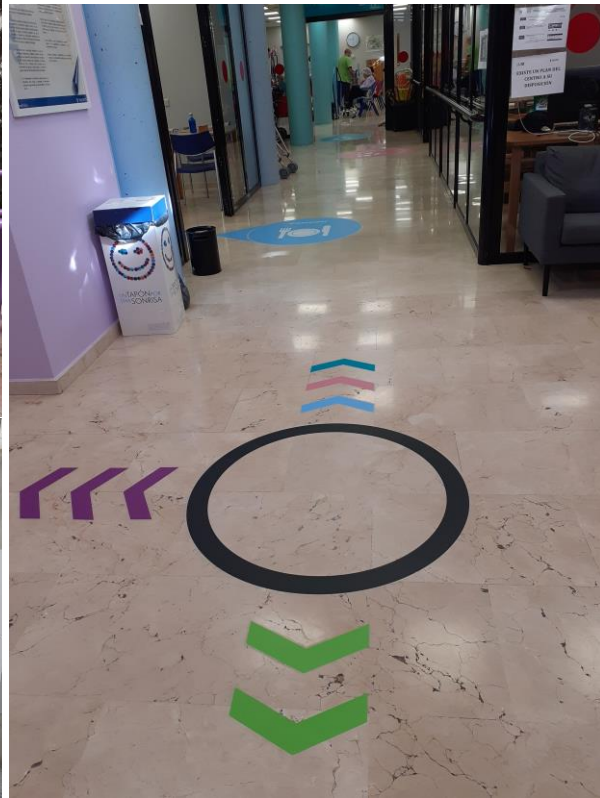
-  Acceso / Salida del edificio
-  Circuito 1
-  Circuito 2
-  Circuito 3

PLANTA PRIMERA

-  Circuito 4
-  Circuito 5
-  Circuito 6

 **SINAPSIS**

SPACIAL SCENARIOS





TRANSFORM DESIGN COMPONENTS INTO INDICATORS

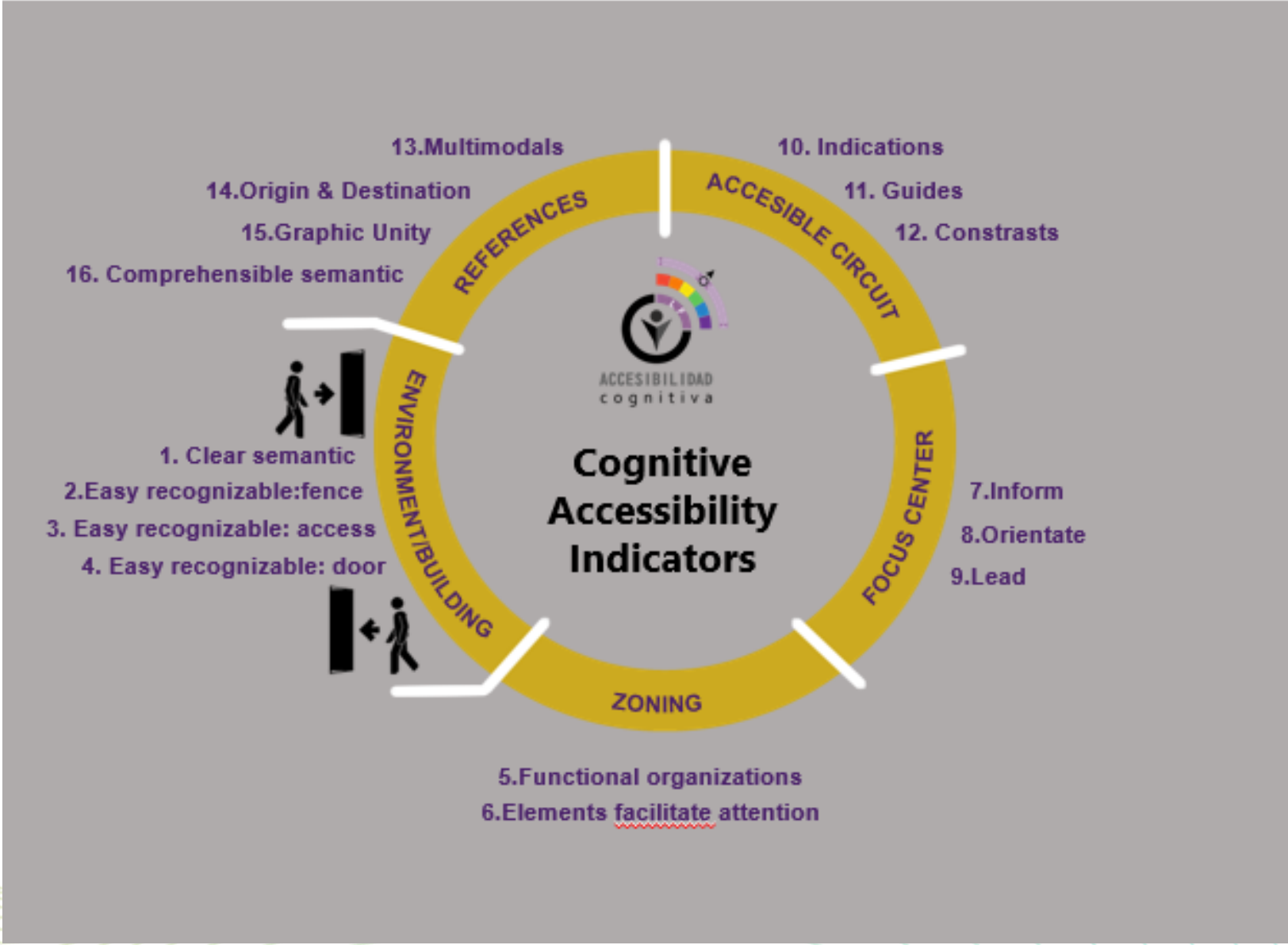
- Is it possible to establish a system for evaluating **people's behavior** as they wander through environments and buildings that guarantees their autonomy?
- We transform design components into **indicators for the design and evaluation of cognitive accessibility**



INDICATORS AND INDEX

THESE COMPONENTS **BECOME** INDICATORS OF SENSORY AND COGNITIVE ACCESSIBILITY.

THE RESULT OF COMBINING THE INDICATORS IS PROCESSED AS **A COGNITIVE ACCESSIBILITY INDEX**



INDEX: SENSORIAL AND COGNITIVE ACCESIBILITY

It is the numerical expression of the relationship of 20 indicators or more, (it's depending on groups or people) that reflects the situation in which an environment or building is located at a certain moment, considering aspects such as orientation, attention, perception or memory of individuals,

Indicators can become into recommendations for design and evaluation, and these in technical design standards (*LEGAL STANDARDS*).



INDICATORS

Once the values corresponding to each indicator (i) with their corresponding weights or weights (P) have been obtained, the final value is obtained with the following formula:

$$\acute{I}AC = \frac{\sum_{i=1}^n p_i a_i}{\sum_{i=1}^n p_i}$$

Where:

- a_i is the score associated with the cognitive accessibility indicator “i”.
- P_i is the weight associated with the indicator a_i .
- n : number of indicators, (variable).

	(a)						
	Indicadores (i)	Máximo	Bueno	Regular	No cumple (está en falta)	Incumple (infringe, vulnera la seguridad, puede ser causa de peligro)	Peso (P)
SEC		SEC1	SEC2	SEC3	SEC4	SEC 5	
		1	0,75	0,50	0,25	0	
	ENTORNO O EDIFICIO						
1	El edificio se reconoce: forma clara o referencias	150 metros	100 metros	50 metros	25 metros	Menor de 25 y no se reconoce	1
2	Si hay valla: el acceso se reconoce	100 metros	75 metros	50 metros	25 metros	Menor de 25 y no se reconoce	1
3	Si hay espacio exterior o patio, la puerta se destaca	Se identifica a 10 metros	Se identifica frente al número de calle	Se identifica, pero no hay número de la calle	Hay obstáculos, pero se reconoce	No se identifica	1
4	Si no hay espacio exterior, la puerta se destaca	Se identifica a 10 metros	Se identifica frente al número de la calle	Se identifica, pero no hay número de calle	Hay obstáculos, pero se reconoce	No se identifica	1
	CONTENIDOS						
5	Facilitan la atención: distribución de objetos, mobiliario y llamadas de atención	Claridad en todos los sectores funcionales y en sus relaciones	Claridad parcial (75%) exceso de llamadas y objetos	Claridad parcial (50%) exceso de llamadas y objetos	Confusión, excesos en todos los sectores, admite corrección	Confusión excesos en todos los sectores, no admite corrección	1.40

PARTICIPATORY METHODOLOGY WITH USERS

- DISABILITY PEOPLE OR OTHERS (SENIORS)
- EASY READING
- TRAINING
- EVALUACIONES
- DESIGN
- COGNITIVE ACCESSIBILITY INDEX





INCLUSION AND TRAINING



GESTIÓN

EJE 2

Difusión del conocimiento

Diagnóstico de accesibilidad cognitiva en espacios y entornos de trabajo



BERTA BRUSILOVSKY

ARQUITECTURA DEL JUEGO,
ESTÍMULO SENSORIAL Y COGNITIVO
DESDE LA INFANCIA HASTA
LA ADOLESCENCIA

Accesibilidad cognitiva
y recreación en áreas urbanas



Entilema

BERTA BRUSILOVSKY

THE ARCHITECTURE OF PLAY,
SENSORY AND COGNITIVE STIMULATION
FROM CHILDHOOD
TO ADOLESCENCE

Cognitive accessibility
and recreation in urban areas



Entilema



Espacios para el bienestar, atención a la diversidad: Derecho a la calidad de vida para la diversidad: entorno, arquitectura, accesibilidad, seguridad



Berta L. Brusilovsky Filer
PNUD, 2003 - 91 páginas

★★★★★

0 Reseñas

Clasificación previa - Calidad de vida - Personas y personajes - Espacios para el bienestar - Reflexiones finales: Urbanismo y arquitectura para el aprendizaje. Apéndice: El método y las técnicas de investigación. Mecanismos del aprendizaje y la memoria. Estrategias de investigación en el retraso mental.

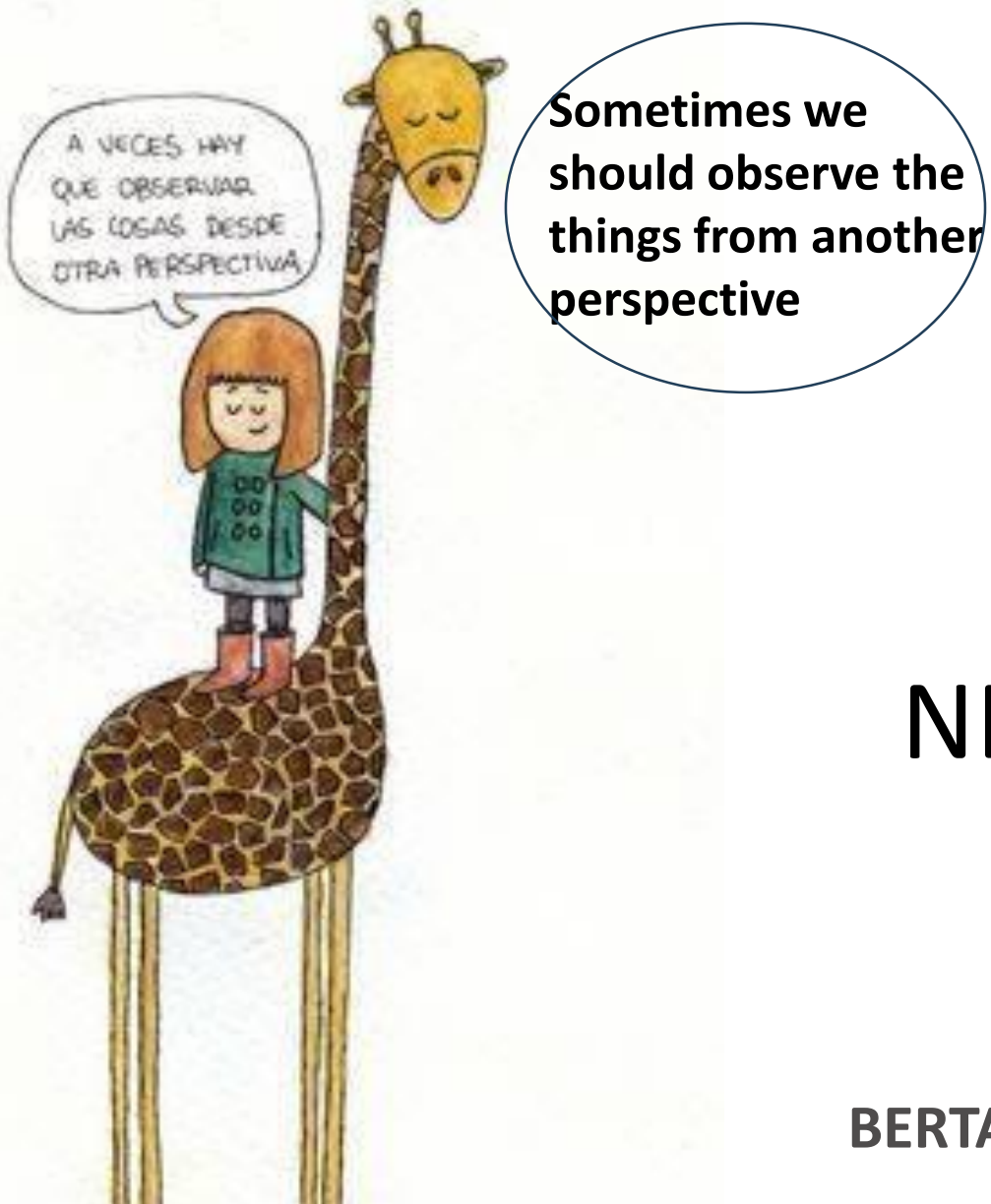
¡THANK YOU!

<https://seguridadespacialconitiva.org>
contactoacfee@gmail.com



Implementation of the Model in Different Contexts

Ms Berta Brusilovsky Filer



NEURODIVERSITY AND DESIGN EXAMPLES

BERTA BRUSILOVSKY FILER - ARCHITECT

PRESENTATION

The architect who knows the features of the people or target groups of his projects will always succeed in his results.

The final design, adjusted to the requirements of functioning, development and of people's emotions is always effective.

The emotions, are very important responses of the human nervous system, which must be consider when working with vulnerable groups and neurodiversity.



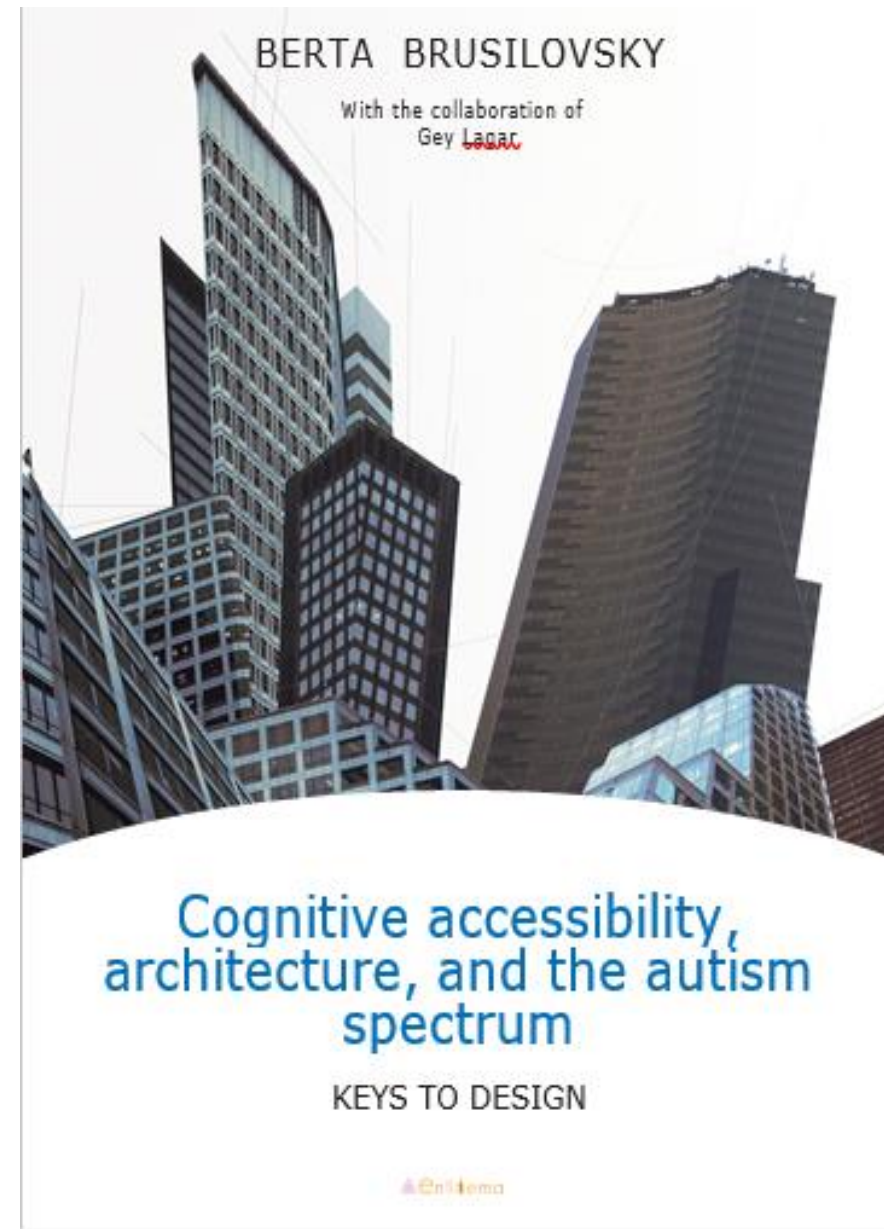
NEURODIVERSITIES AND DESIGN

IT COULD BE USED IN TERMS OF SENSORIAL,
INTELLECTUAL DISABILITIES AND MENTAL HEALTH

TOPICS

People with intellectual disabilities or cognitive impairment needs **cognitive spatial security**.

People with neurodiversity's needs cognitive spatial security + **specials conditions related to their way of being**



OBJECTIVES

(As Angel Riviere said)

We should relate “*normal*” development to neurodiversity.

And understand which aspects of the former are qualitatively altered in neurodiverse brains.

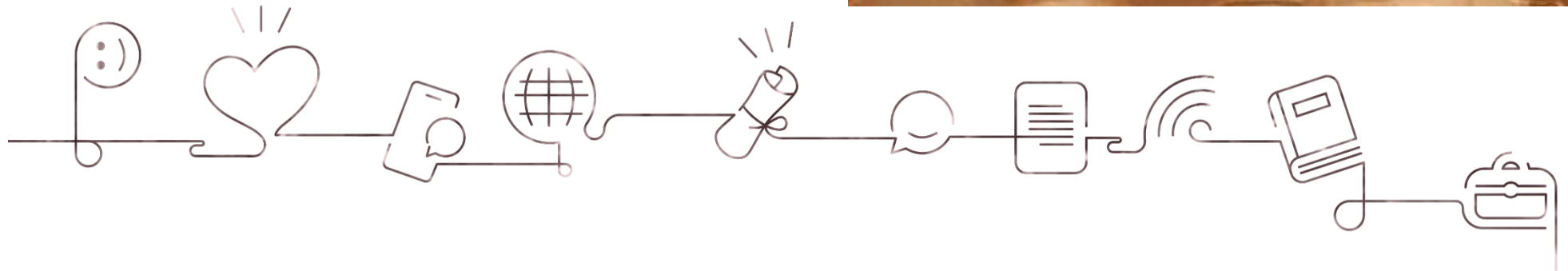
Investigate which is the most effective approach and instruments for the design of spaces that best adapt to them.



AND THIS WAS ALSO MY EXPERIENCE: HOW THE BRAIN AND THE MIND WORK BETTER

1- NEURODIVERSITY AND COGNITIVE SPATIAL SECURITY

NEUROSCIENCE AND ARCHITECTURE



METHODOLOGY: NEUROLOGIC PROFILE FOR DESIGNING

Relate **normal** development to neurodiversity and understand which aspects of the former (**normal**) are qualitatively altered in neurodiversity and autism as functioning model).

- a) How does it work without blockages in nerve impulses (sensorial, perception, cognitive, emotional and motor)
- b) With blockages in nerve impulses that could affect functional capacity: to develop sensory experiences (vision, hearing, somatosensory) To transform the sensory into perception, cognition **and cause motor actions**
- a) Understand these blockages (**frame or list of blockages**)

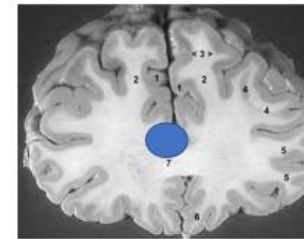


How to design from the “**frame or list of blockages**” to **break them** and improve behaviors. Whenever could be possible... and we **should make it happen**.

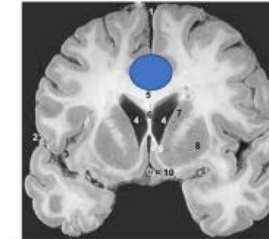
WHY FROM AUTISM TO NEURODIVERSITY?

Autism is a polygenic neurobiological condition that begins in early development: no specific autism gene has been found; hence it has similarities with other diseases or disorders.

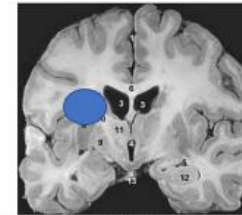
SECCIONES MACROSCÓPICAS CEREBRALES



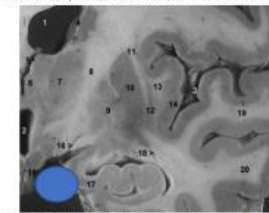
1. sustancia gris cortical, 2. sustancia blanca, 3. circunvolución frontal superior, 4. circunvolución frontal media, 5. circunvolución frontal inferior, 6. giro recto, 7. rodilla del cuerpo calloso



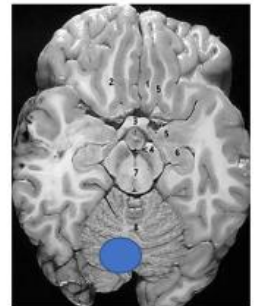
1. clausura interhemisférica, 2. clausura lateral, 3. tálamo de la insula y ramas de la arteria cerebral media, 4. ventrículo lateral, 5. cuerpo calloso, 6. septum lucidum, 7. cabeza del núcleo caudado, 8. putamen, 9. tercer ventrículo, 10. amígdala, 11. cerebelo



1. clausura interhemisférica, 2. clausura lateral y ramas de la arteria cerebral media, 3. ventrículo lateral, 4. tercer ventrículo, 5. prolongación estriada del ventrículo lateral, 6. cuerpo calloso, 7. cuerpo del núcleo caudado, 8. putamen, 9. giroso palato, 10. capsula interna, 11. tálamo, 12. hipocampo, 13. cuerpo mamilario



1. ventrículo lateral, 2. tercer ventrículo, 3. clausura lateral y ramas de la arteria cerebral media, 4. cuerpo del núcleo caudado, 5. núcleo anterior del tálamo, 6. núcleo dorso medial del tálamo, 7. núcleo ventrolateral del tálamo, 8. capsula interna, 9. giroso palato, 10. putamen, 11. capsula externa, 12. amígdala, 13. cuerpo mamilario, 14. corteza del tálamo de la insula, 15. cuerpo mamilario, 16. vía óptica, 17. hipocampo, 18. comisura blanca anterior, 19. circunvolución temporal superior, 20. circunvolución temporal media



1. giroso recto, 2. giroso orbitario, 3. quiasma y cintilla óptica, 4. tubérculos mamilares, 5. amígdala, 6. hipocampo, 7. mesencefalo, 8. cerebelo

AND THESE ARE THE REASONS **WHY** AUTISM WORKS **IN A CERTAIN WAY**

BRAIN AND MIND

The brain has neurons (brain cell bodies) and organized connections of various types, with long connections between them that make up **white matter and gray matter**.

Neurons: a cell body, called a soma; one or several short extensions that usually transmit impulses towards the cell body, called dendrites; and a long extension, called an axon (with white colour of the myelin), that conducts impulses from the soma to another neuron.

Neurona

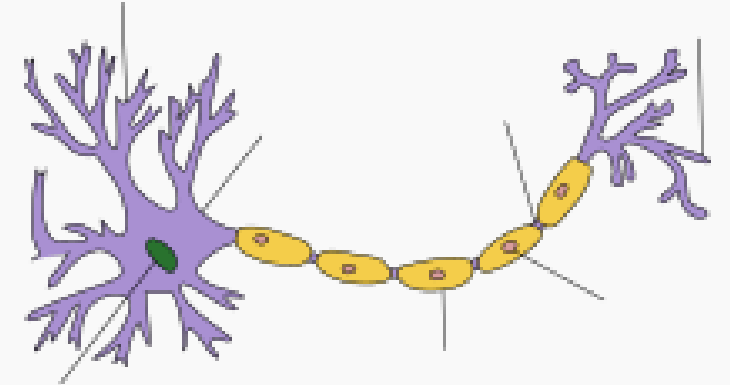


Diagrama básico de una neurona

**AND THESE ARE THE REASONS
WHY NEURODIVERSITY WORKS
IN A CERTAIN WAY**

AUTISM: REGIONS POSSIBLY AFFECTED

THE **INTERNAL CAPSULE** is composed of white matter (most important portion of white matter), that is, nerve fibers covered with myelin, a substance that surrounds and protects the axons, allowing a **greater speed in the transmission of the nerve impulse**. It carries **motor information** from the primary motor cortex **to lower motor neurons in the spinal cord**.



CEREBELLUM: constituted by a mass of nervous tissue and that oversees muscular coordination and other movements not controlled by the will. Its main function is **to integrate the sensory pathways and the motor pathways**.

The cerebellum processes information from other areas of the brain, the spinal cord, and sensory receptors in order to indicate the exact time for **smooth, coordinated movements of the skeletal muscle system**. If the cerebellum is affected it can cause dizziness, nausea, and **problems with balance and coordination**.

REGIONS POSSIBLY AFFECTED

AMYGDALA

The amygdala is a structure located in the temporal lobe formed by different nuclei and traditionally related to the emotional system of the brain

Some authors have proposed an alternative function of the amygdala by considering it as part of a memory-modulating system. A large amount of experimental data corroborates both functions.

The relationship of the amygdala with emotions has focused on the study of *fear conditioning*, through which an emotionally neutral stimulus can produce emotional reactions due to its temporary association with an adverse stimulus. It has been found that the amygdala is necessary for the learning and expression of this conditioning, and therefore is involved in emotional learning.

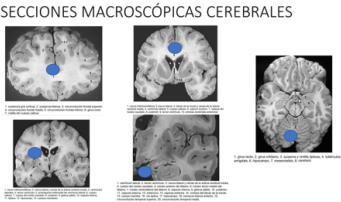
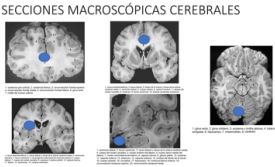
REGIONS POSSIBLY AFFECTED

STRATIUM

It is associated with voluntary movements that involve the entire body in routine or everyday tasks.

The **corpus striatum** is also known as the "nucleus striatum" and "neostriatum". It is a set of structures located at the subcortical level that in turn forms part of the basal ganglia, involved in the regulation of intentional and automatic movements, as well as in procedural learning, reinforcement

- **Motor learning.**
- **Processing of procedural memory.**
- **Start of voluntary movements.**
- **Regulation of voluntary movements: direction, intensity, amplitude...**
- **Execution of automatic movements.**
- **Beginning of eye movements.**
- **Regulation of working (or operational) memory.**
- **Focus of attention.**
- **Regulation of motivated behavior (dopamine).**
- **Selection of actions based on the expected reward.**

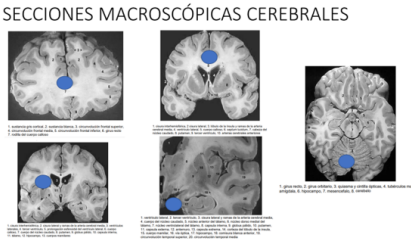


PERCEPTION OF BIOLOGICAL MOTION IN AUTISM SPECTRUM DISORDERS

In individuals with autism or autism-spectrum-disorder (ASD), conflicting results have been reported regarding the processing of **biological motion tasks**.

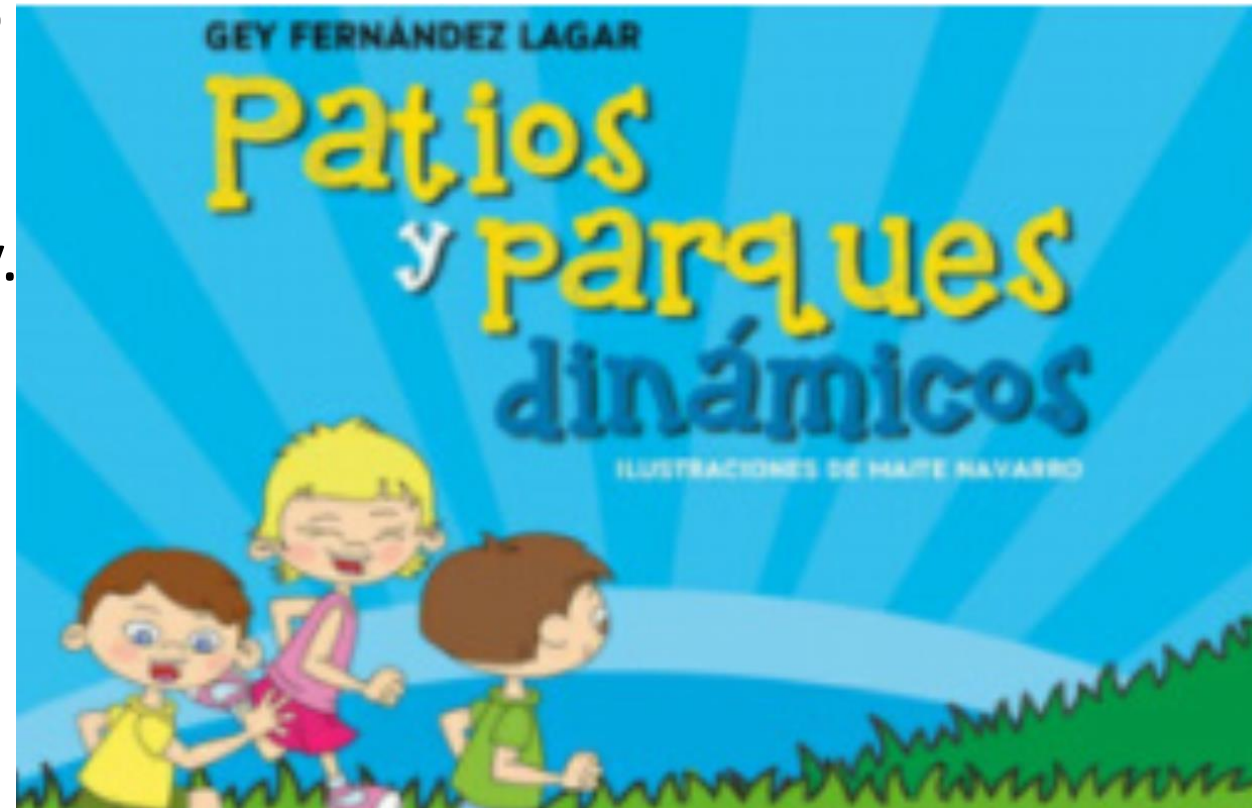
Perception motion was compared between groups, and correlation patterns of imitation, gross motor and behavioral measures with neuronal activation were explored.

Differences in local gray matter volume between groups as well as correlation patterns of psychopathological measures with **gray matter volume** were additionally compared (Less gray matter and more gray matter)



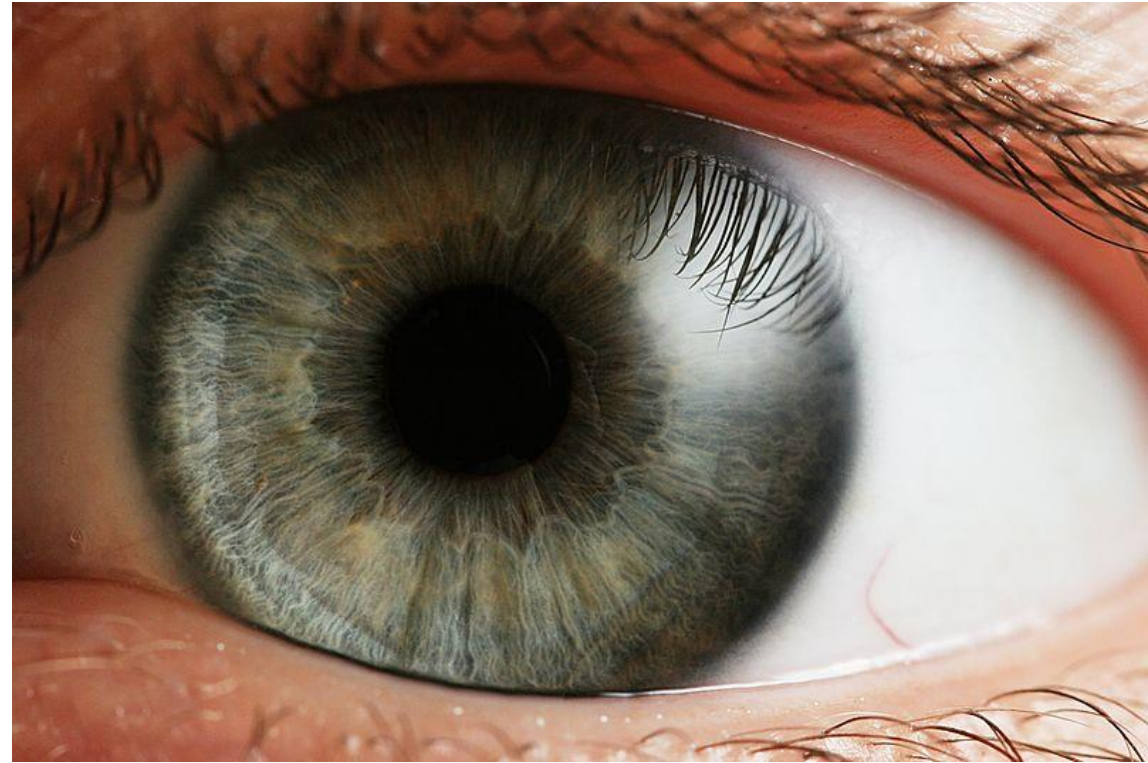
WORKING MEMORY

- It is a type of memory that helps us to do activities one after the other remembering what happened before to be able to do the next phase sequentially.
- In this case being able to pay attention is very important.
- In other cases, we should repeat or let them take their time to understand and act. (processing speed).



SENSORIAL: VISUAL SENSIBILITY

Child with neurodiversity (as autism and similar) may have a certain predilection for focal type vision, it is common to see him or her take an object and stare at it, as if recording each detail that is more important (for him or her) than the whole. This "special" way of using vision, his "special" way of using vision refers to both the focal and peripheral levels.



SENSORIAL: VISUAL AND AUDITIVE SENSIBILITY

Scientists have known, or at least have been investigating for a long time, that both eyes and ears participate **simultaneously in visual and auditory capacity.**

"Essentially, it's as if the brain planned to move the eyes and, at that moment, said: wait, better that the eardrums (timpanos) do too".

This synchrony may be altered in some cases (as autism).



SPATIAL ORIENTATION

Difficulties in **the integration of sensory information**, necessary to understand social situations and the perspective of others (Baron-Cohen et al., 1985).

This phenomenon would favor the focus of attention on very specific details of reality and not on the set of elements that make it up. In perceptual processing, it is common to find a tendency to prioritize details over the global level of stimuli and situations (Happé & Frith, 2006).

WERE EXPLAINED AS:

- **Sensorial integration**
- **Weak central coherence: First Utah Frith and after Baron Cohen:** This focus on details leads to difficulties in **processing context, extracting meaning, and prototyping (or patterns).**



THIS HAS CONSEQUENCES IN SPATIAL ORIENTATION

SPEED PROCCESSING

- Sensorial integration

Sensory integration is defined as the process by which our central nervous system receives all the sensations that come to it through the senses, interprets them and organizes them to give rise to adaptive responses.

- Weak central coherence:

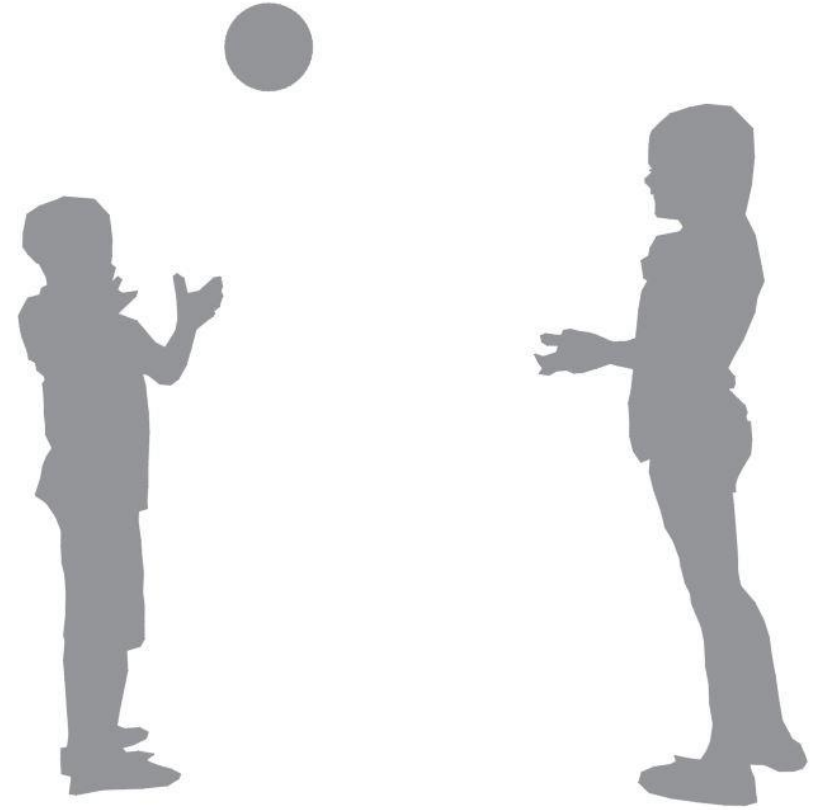
First Utah Frith and after Baron Cohen: This focus on details leads to difficulties in processing context, extracting meaning, and prototyping (or patterns).



CONCLUSIONS

The correlation of neuronal activation during the perception of biological movement emphasizes the importance of the difficulties:

- In the perception of biological movement,
- Gross motor difficulties in individuals
- identification impairment between ***oneself and the other*** for the imitation of the action.



CONDITIONS THAT CAN BE THE CAUSE OF COMPLEX BEHAVIORS IN SPACE

WE MUST TO KNOW AND UNDERTAND THEM

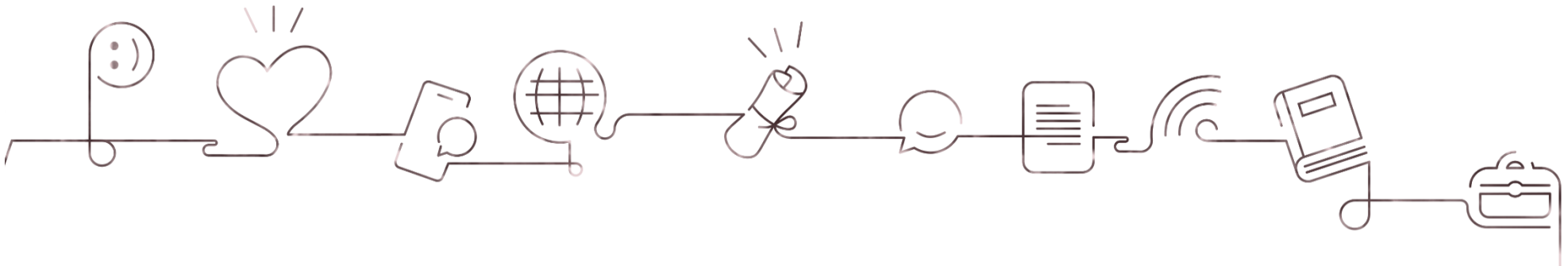
a. SPATIAL DEVELOPMENT AND MOVILITY

Anticipation

Flexibility

Impulses

Walking



a.1 ANTICIPATION

When events are anticipated, the ability to "make sense" of situations is improved and some repetitions facilitate anticipation.

Anticipating means reporting what is important and what is going to happen: repetition facilitates anticipation.



Anticipation, influences attention, guides and directs when it is necessary to make use of the available information.

a.3. IMPULSES

Run away impulses: or his way of interpreting it as a game: run away. It's in "the nature of autism" said study co-author Dr. Paul Law. "Children lack the social skills to talk to their parents sooner, but they have the need most children have when they come to a crossroads or a park: to run. Or that impulse is greater."



a.2-IN-FLEXIBILITY

Need for routines, repetition, has great resistance to change...

They need controlled changes to break routines, **always agreed with them.**

Know what is before and what will be after
This project represents several of the concepts discussed in the previous slide:
- alternative paths, can be use with flexibility



a.4. WALKING

Placement

Head rotations can cause imbalance or dizziness: vertigo and instability and loss of balance

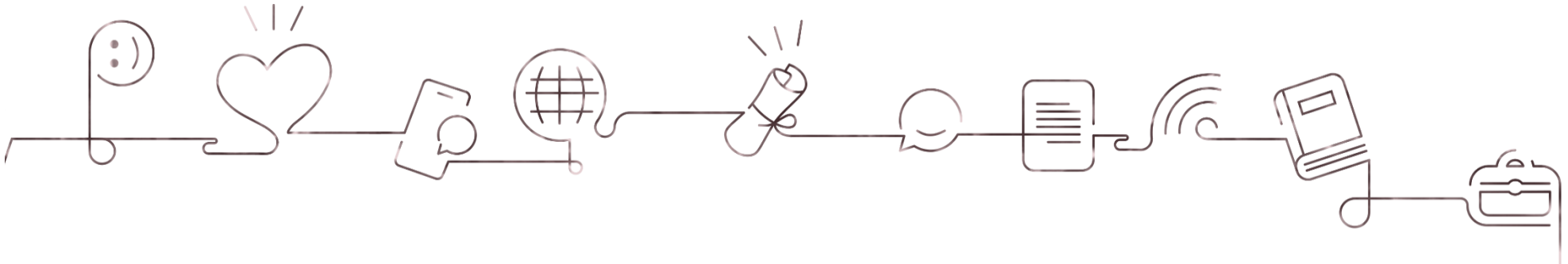
To walk

They walk on tiptoe (walk on the balls of the feet)
Sensitivity to visual elements placed **on the ground**

He or she spin and spin and spin and hits



b. WHAT'S TIME AND HOW CAN I MEASURE IT?

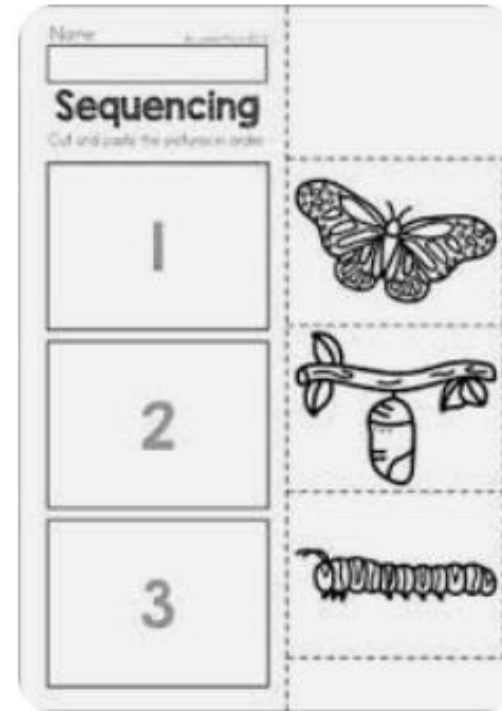


b.1 SPACE AND TIME

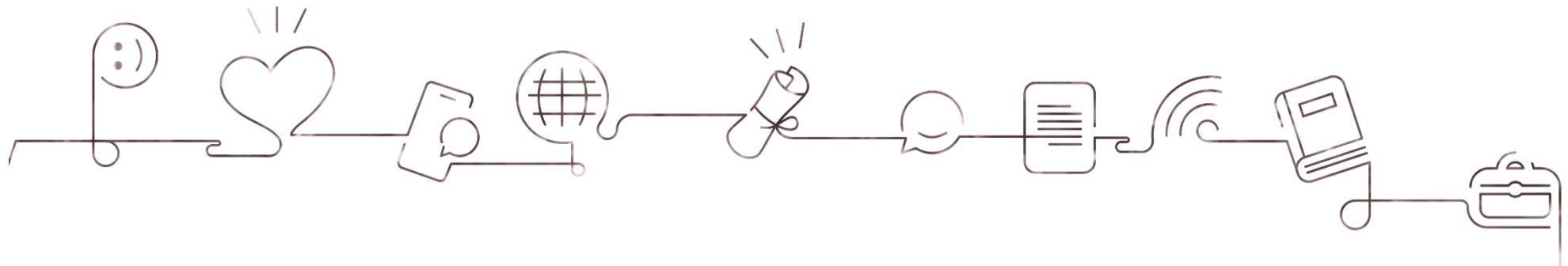
“Perhaps these aspects are also directly involved in the difficulty of managing or estimating time. That is why we must help them with designs that make it easier for them to identify what an (abstract) process is, the explanation of which is often difficult for those of us who call ourselves neurotypical.

Routines: look for the sequential order of events in the agendas of activities, and objects of each day

The movement of the sun is one of the best clocks to measure the passage of time



c. GLOBALITY AND DETAIL



c.1.FRAGMENTED PERCEPTION

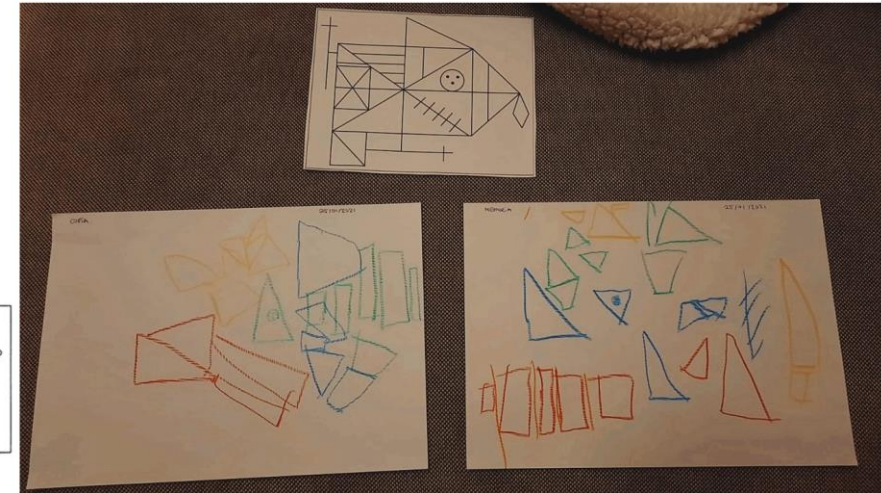
People with neurodiversity define beings, things and places taking the parts as a reference instead of the whole.

What makes us not live in a chaotic or fragmented world is the function of **gnosis**, it refers to the ability to recognize objects, people, faces, spaces, etc. In addition, it is also the faculty that offers us a **global and united perception of reality** and not schematic or "by parts".

In “***apperceptive visual agnosia***” this integration is severely affected, and the person shows deficits even in the recognition of the simplest forms.

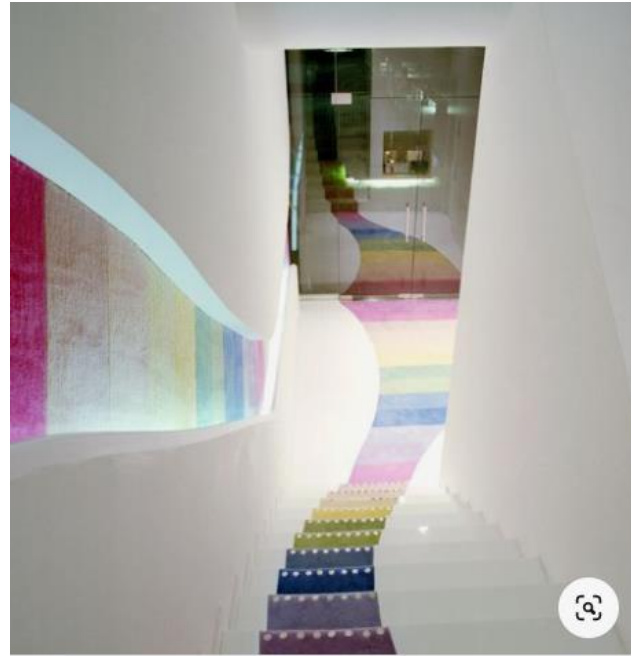
c.2 FRAGMENT PERCEPTION

THIS IS THE
INTERPRETATION
ABOUT THE "REY
COMPLETE FIGURE"



c.3.DISTORTED PERCEPTION

It is the change that can occur in the perception of form, space or sound, especially it can occur at times when they are overexcited or nervous, for example, a child who is afraid to go down the stairs or raises his feet too high when climb the stairs above the steps.



c.4. RETARDED PERCEPTION

TIME TO PRECESS INFORMATION

They may have delayed responses to stimuli in any sensory channel (vision, hearing, touch, smell, or taste): they need more time to process their answers, to see and identify the full picture, to move from one space to another.



Art and architecture, named “De-composition of geometrie from Felice Varini

c.5. INCONSISTENCE AND FLUCTUATION

HIPER O HIPO

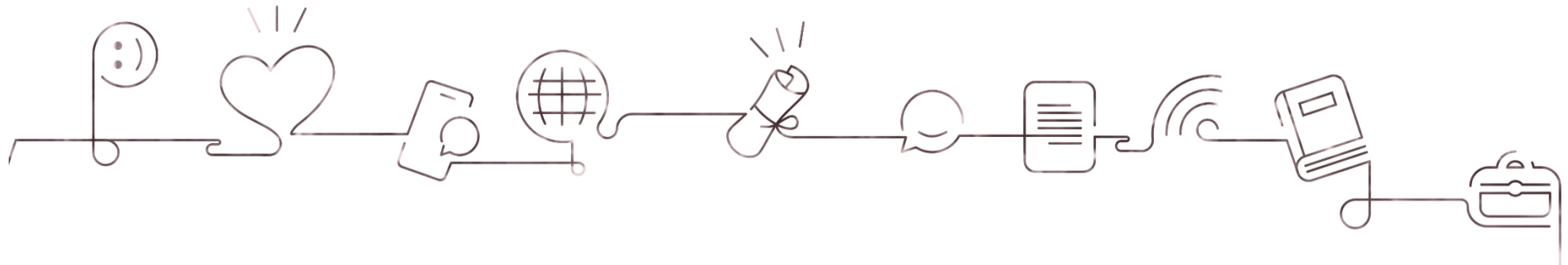
UP AND DOWN

Incoherent perception of stately stimuli is one of the most puzzling features.

Alterations in their balance so they may seek stimulation through a lot of activity...or sit and isolate themselves



d. IMITATION, FICTION AND ABSTRACTION



d.1.IMITATION,FICTION, ABSTRACTION

Getting the child to simulate, and from there, moving forward and dedicating special attention to establishing the basic premises of imitation is the way to model imitation and ensure that these learned actions become playful and imaginary.



We will work *explicitly and systematically*, starting from *interesting places and objects for him*, to develop a ***range of imitative behaviors*** based on his interests: if he is attracted to cars on a motorway or if he is a fan of baseball, imagine that he is a player on a soccer field.



SPATIAL ROUTE: THE PROJECT

80% of the stimuli we receive have a ***visual and spatial origin***. Even blind people.

Today it is known that the desynchrony between vision and hearing in some neurodiversities is common.

Also, aspects related to spatial location or aspects related to focal vision.

How does the spaces in which they move affect people with this conditions?

Floors, stairs, corridors and walls are perceived as pieces of a huge unassembled puzzle and colors and textures as an aggression that can lead to disorientation, confusion and isolation.

DESIGN AND RECOMENDATIONS

How does the spaces in which they move affect people?

Floors, stairs, corridors and walls are perceived as pieces of a huge unassembled puzzle and colors and textures as an aggression that can lead to disorientation, confusion and isolation.

A set of spatial coordinates that free the user from the anguish of not recognising, or not understanding, and thus helps them be able to find the spaces they need at any given moment.

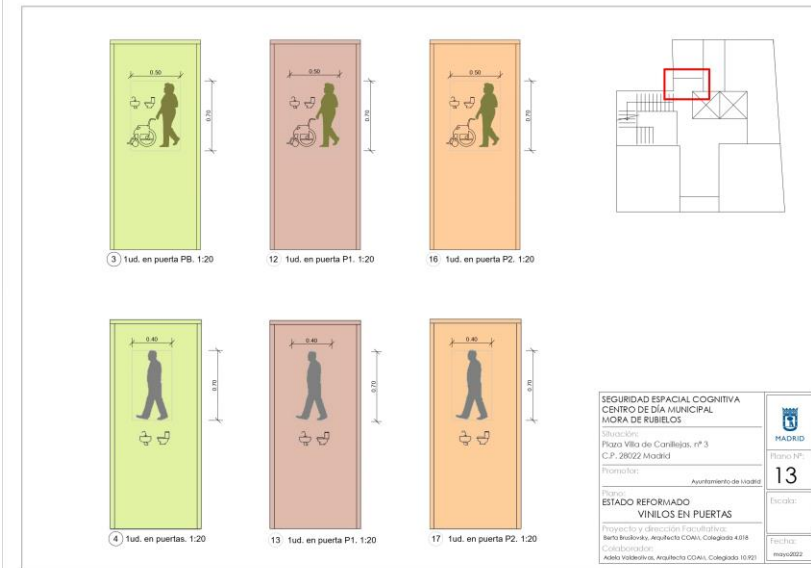
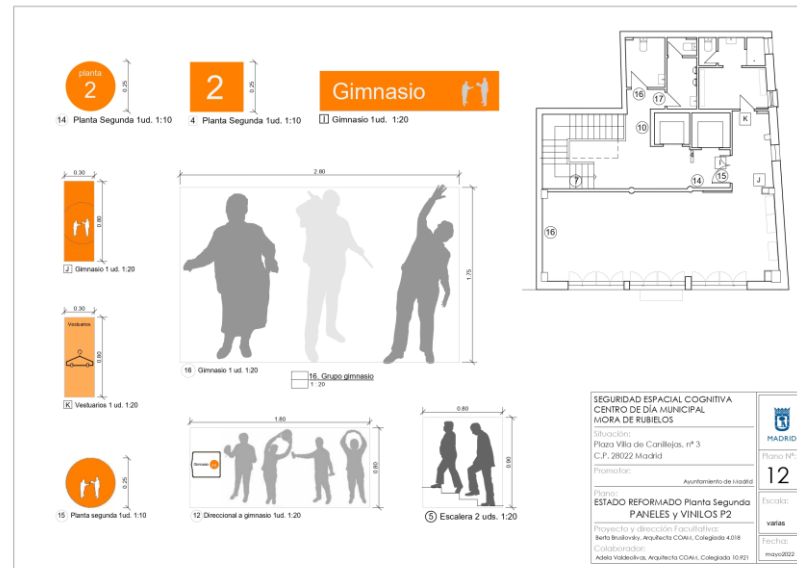
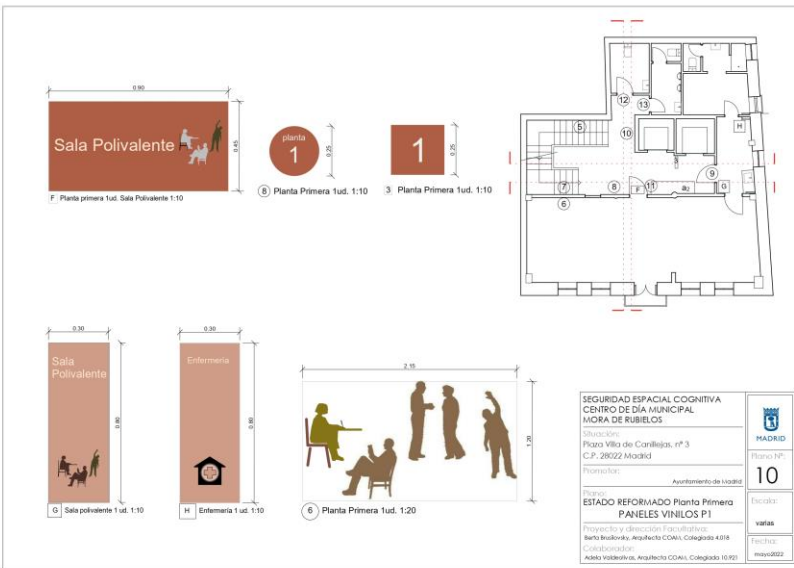
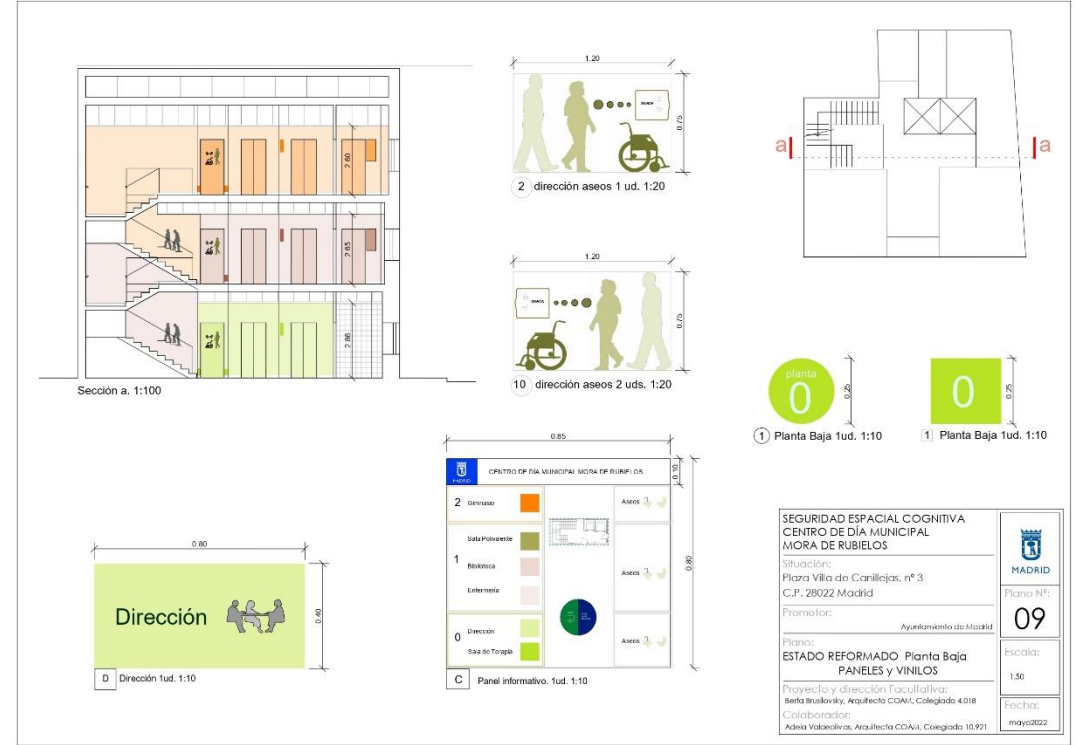
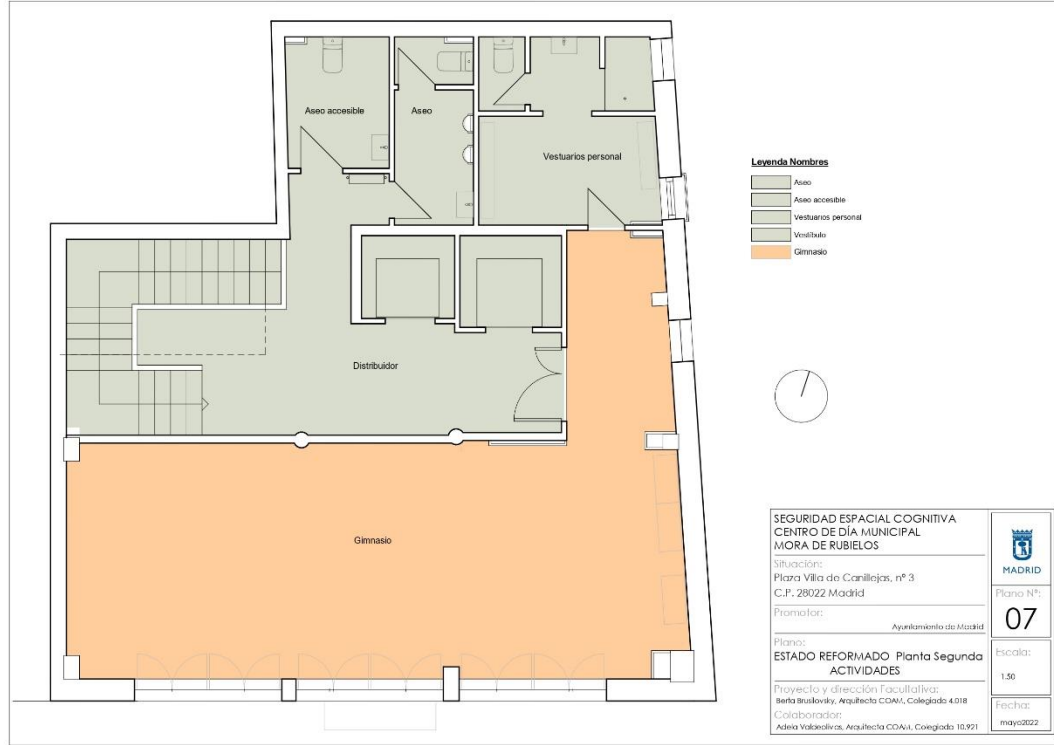
THE PROJECT

Formal is the project: in terms of plans, elevations and sections

Functional: needs and relationship between activities

Sensorial: one before or after the other in terms of sensorial needs

Recommendations	Developing components		
	Spatial	Specific spatial support for physical and cognitive functioning	
General floor plan organisation: zoning and relationships that weave the structure together	Zoning Functional with synaptic interfaces Functional and sensory Based on special resources or support for sensory artistic skills (gardening, vegetable garden)	They pattern activities by their level of effort: physical and cognitive With synaptic interfaces as a regulating or attenuating component for emotional equilibrium.	
	Components for spatial development: fundamental in the interweaving of the structure	Moderating synaptic interfaces between activities	Anticipation, transition, adaptation and meeting
		Spatial orientation	
		Safety Balance Drives	
		Flexibility	
		Movements in space	
		Balance	
	For the understanding of the concept of time	Space and light	
Special features (sections and elevations with details)	Perception: globality and detail slow processing	Fragmented	
		Distorted	
		Inconsistency or fluctuation	
	Space and symbolisation	Imitation	
		Fiction	
		Suspension	
		Abstraction	



a, b) ORGANIZATION

a) Elements for relationship

Principal focal centre: centralized and organized the building

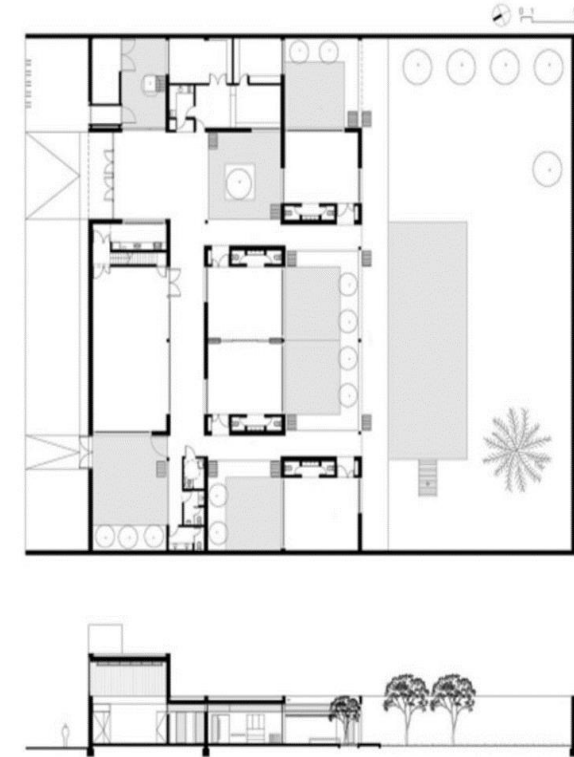
Secondary focal centre organize the activities

Relations between activities: corridors and flexible routes

a1) Exterior, the limits (escapist drive)

The limits will not be opaque, preferably with vegetation, but limiting, due to their height and thickness, the spaces that should give safety without being aware of them means a permanent anguish to know where they are.

a.2) Access: Another way to promote this moment: access and exit is to build access routes from the outside directly to the interior, with different qualities of layout and length.

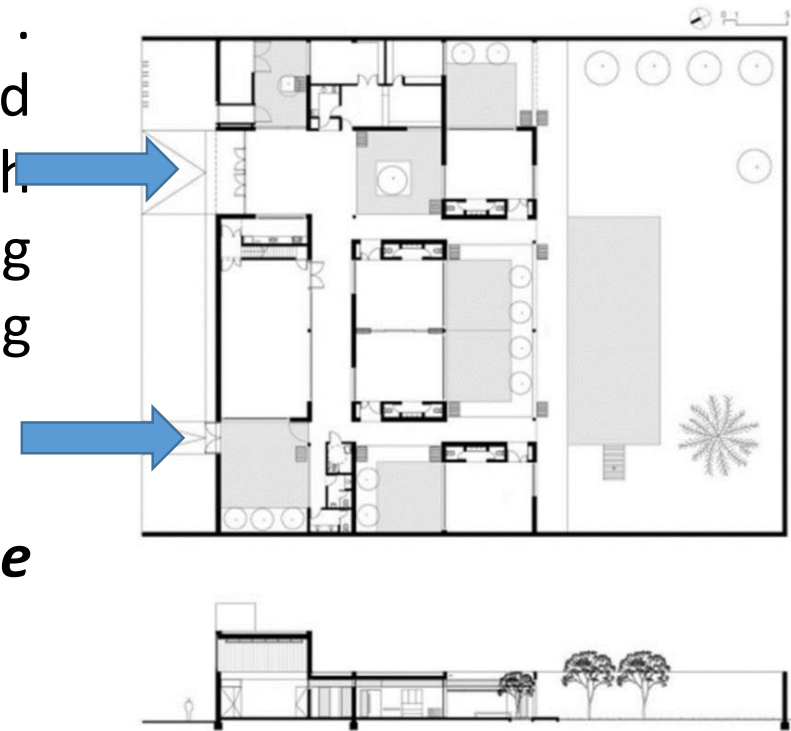


a, b) ORGANIZATION

b) Access

In inclusive facilities: educational, recreational...or others) where large groups of students (people) accumulate at the time of entry and exit, a lot of noise and total lack of comfort, the splitting of the accesses could avoid the possibilities of having to face crowds . Another way to promote this moment: access and exit is to build access routes from the outside directly to the classrooms, with different qualities of layout and length. Without this creating differentiation between one group and another, that is, integrating (e.g) students with different characteristics in each of the groups.

b1) Where should the entrances and exits be to conjure the impulse to flee? Away from the activities...



c) RUTES DEFINITION

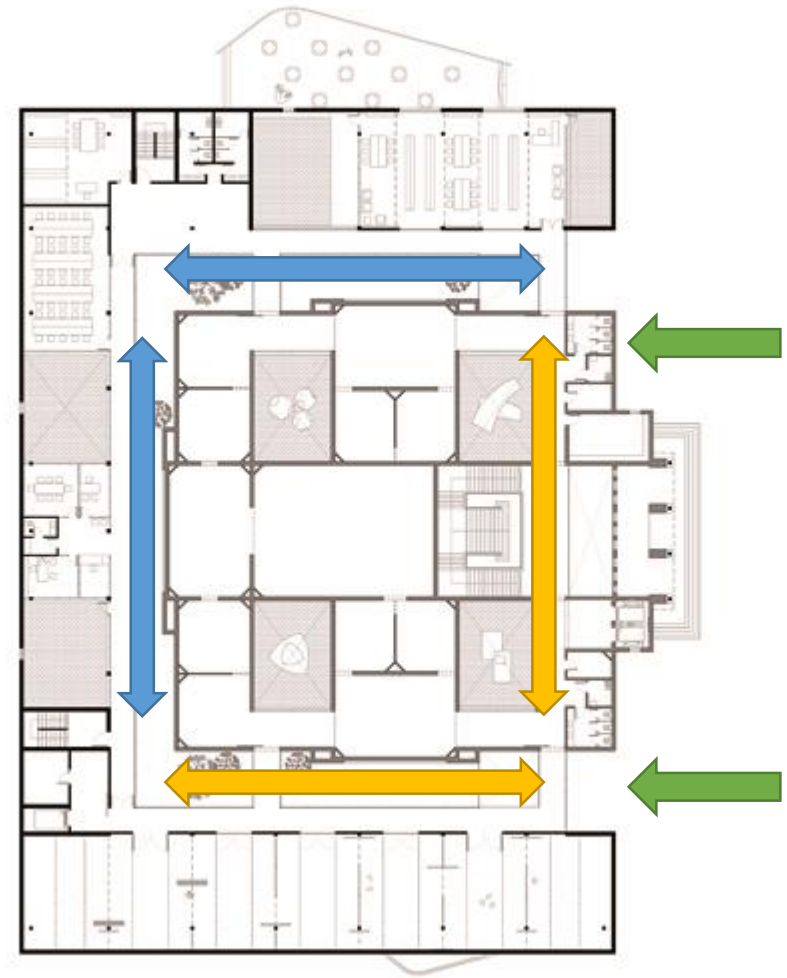
c1) Definition of routes

Mark tours without mixing images and sounds.

Layout of sensory corridors with patios of different contents

c2)Flexible Routes:

Possibility of opening and closing routes: teaching to choose, to make routines more flexible



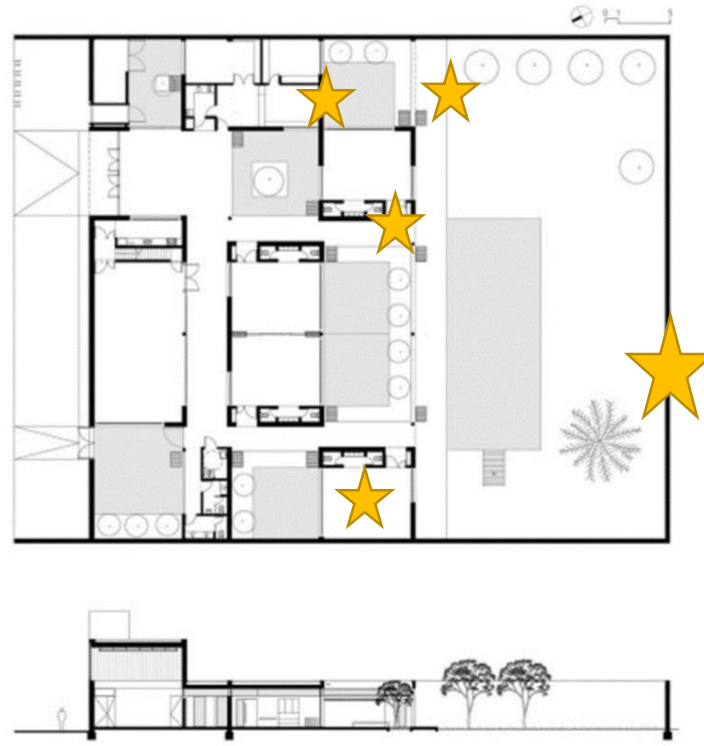
c) RUTES DEFINITION

Anticipation systems are closely related to the meaning of action, people, even the most capable, have difficulties organizing action sequences following a specific plan.

Inform to "give meaning" -serves to provide security and requires a structured world in which it is possible to anticipate what is going to happen: as anticipation and what will happen in the future.

Adaptation is a spatial concept that is used whenever a person must move from one situation to another, in this case from one space to another.

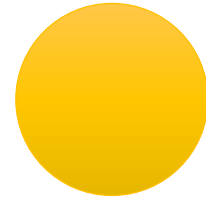
The **transitional** spaces serve so that the emotions of the previous activity subside, and the adaptation can be natural and calm.



PASS OF THE TIME

Sunlight, identified in the spatial route in the patios and in the specialized areas for the morning and differentiated for the afternoon, are a unique part of the inclusive zoning. Identifying an abstract concept such as the passage of time is based on ***circadian rhythms*** so that experiences are different when it is different from the situation of the sun in the sky and sunlight: more less intense.

Diminishing direct **light and glare** is important because hypersensitive people don't take direct sunlight very well, so window blinds or strategic placement of windows can help. Useful for calculating the passage of time: activities ascribed to sunlight, where the sun is at each moment.



PASS OF THE TIME

Activation of circadian rhythms (neuronal rhythms) when on cloudy days the morning is not recognized from the afternoon.

A spatial game: how the shadows move and where they are at each moment.

The best time for learning is in the morning, when the child wakes up. Just spending 30 minutes in the light can improve her mood and habits (playing, eating, sleeping).



DIFFERENTIATED SPACE

In and out (the gate)

The class schedule material to work

Individual work experiential learning

Work and learn with the teacher

computer space

The one with the food, the one with the games

Courtyards according to qualities and activities.

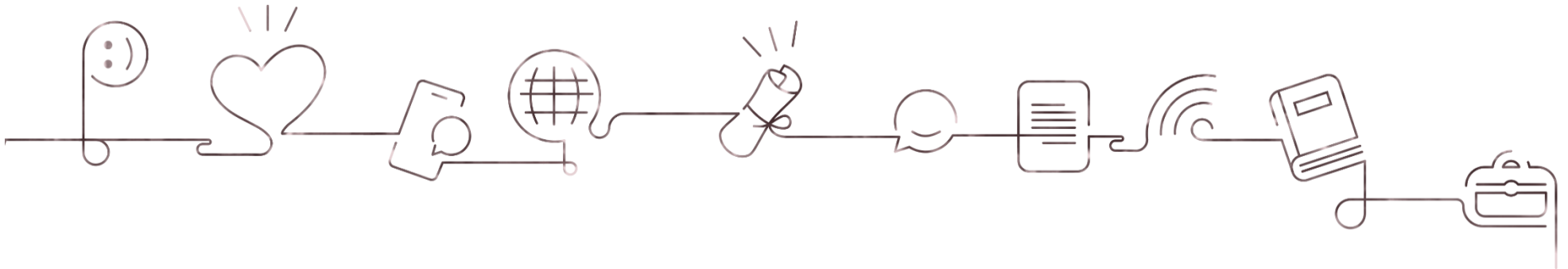


To sleep, Of game, To eat, To save, To share, to be alone

IMITATION, FICTION, IMAGINATION



DESIGN: SHAPES AND COLORS

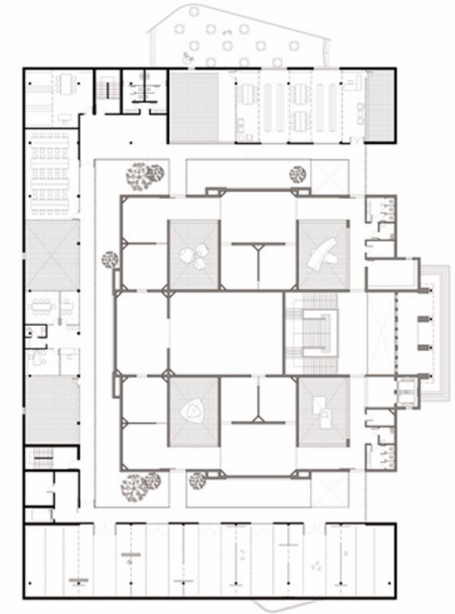
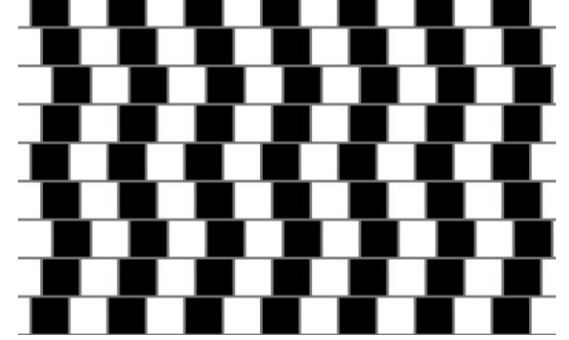


SHAPES

Shapes without complexities avoiding aptitudes for fragmentation (in smaller forms or details) would be the optimal solutions to create paths and places.

They will not be used:

- Forms whose result is an excessive compartmentalization.
- Doors and windows with details and partitioning (doors in corridors).
- Structure of puzzle-like shapes.



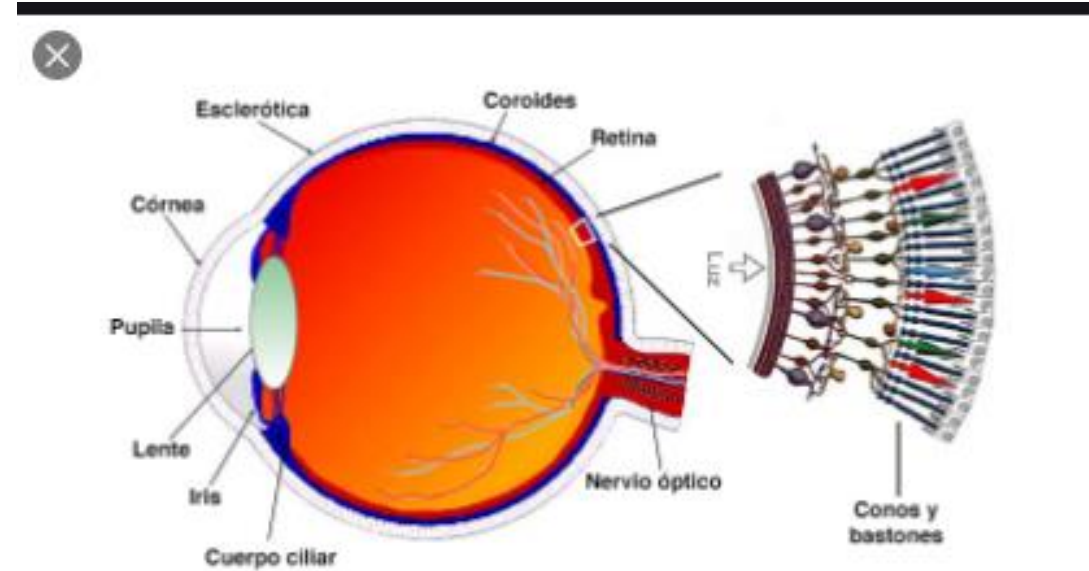
SHAPES



COLOURS

There are colors that disturb them, make them uncomfortable, trigger discomfort, anxiety and stress, especially if they are bright or like yellow.

Perceptual constancy ensures that the perception of an object's color remains unchanged under different lighting conditions.



ENVIRONMENTAL SECURITY

POSITIONING ALTERATIONS

Consider for the design and placement of graphic elements the following difficulties or characteristics that are important:

- Avoid signs and drawings in which there are head rotations
- They could be twist and turn and turn (beating)
- Attention: the doors, entering and leaving (flee from...)
- They are fascinated by objects that move (fans) and “they keep an eye on them”.



ENVIRONMENTAL SECURITY

CONSIDER

- Fearful behaviors towards playgrounds.
- Problems going downstairs or they will always do it holding on to the railings or someone's hand.
- And on the contrary, kamikaze-type behaviors.



ENVIRONMENTAL SECURITY

BECAUSE they are fascinated by parts of objects, rotating parts, letters or logos,...)

DOORS: knock on doors desire to escape

Needs:

Rubber studs or wedges.

Door retainers.

Stopper protector, bumper or anti closure.

Protective bumpers or pads to cover the door handle.

LADDERS: Difficulty calculating heights (distorted)

SUNLIGHT: Absorb glare and make seasonal adjustments.



ENVIRONMENTAL SECURITY

And remember to put signs and emergency plans and elements in case of fire.



FLOORS AND SECURITY

The mixture of lines, shapes and colors on the floor makes it difficult to concentrate their attention: on their body balance and on walking, being able to lose the feeling of place, of location and, therefore, of being able to walk with a specific objective.

Texts and signs on the ground are unnecessary and dangerous, especially at intersections.



ARTIFICIAL LIGHTS AND SECURITY

Summary of the most important aspects:

- Flashing lights can have a very sensitive response to these conditions, including the sound of the lights
 - Lights with colors like **blue** can help to calm down and stimulate creativity.
 - Flashing lights with strong colors can confuse and even damage them: it is important that lighting (both) be controlled and monitored.
 - Lighting innovations from companies like Eaton support the development of sensory rooms for hypersensitive or hyposensitive people. These rooms have controllable light sources, light therapy, and no fluorescent lights (Steele).
-



THE PROJECT

SENSORIAL AND COGNITIVE SECURITY



Building with interior paths to live the passage of time

Two main perpendicular circulations with a shape and color treatment different from the rest of the spaces thus creating two circulation alternatives to reach the activities.

These two paths could be alternatively selected by the child (break rigidities), depending on the hours, activities, etc.- They are closed or opened according to the interests of the working groups.-

A parallel axis would be incorporated to the main one (it is the interior patio with a play space treatment compatible with classroom 1, which is also a path to reach the rear patio.

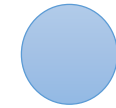
THE PROJECT



Main access and exit node with treatment receives information and addresses (placement of general information), It must inform that there are two main axes in advance to the next node.



Node in sequence, addresses the two circulation axes (indicates two circulations with specific objectives) pictograms.



Node addresses both directions and to the inner courtyard (axis 3): pictograms



Secondary node and services. Emergency exit? according to evacuation regulations.



Alternate axis along the courtyards

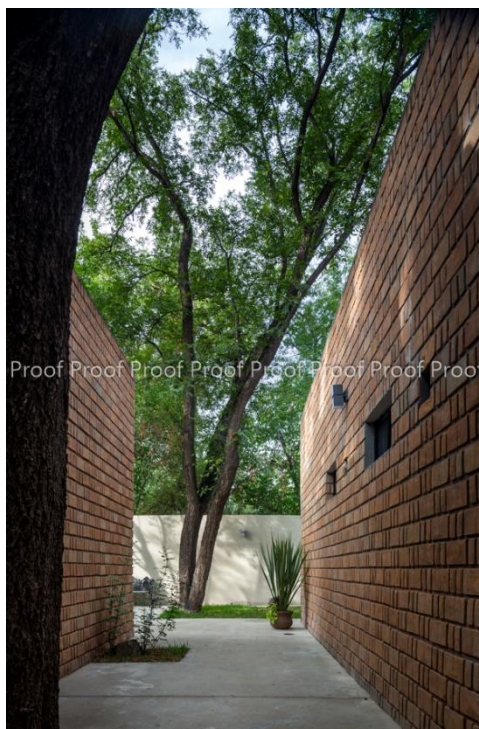
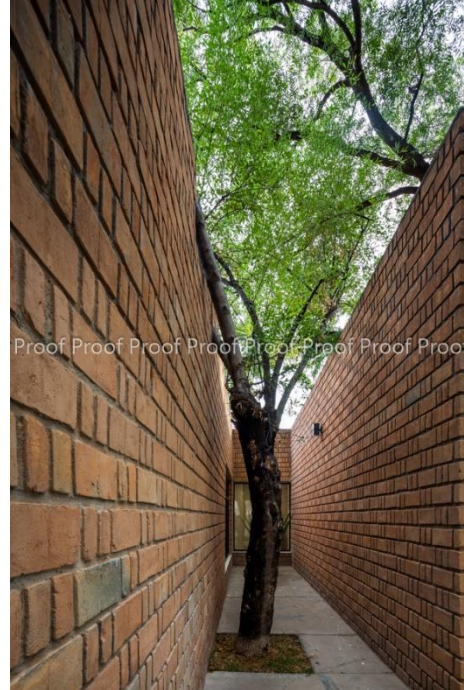
SENSORY DIET

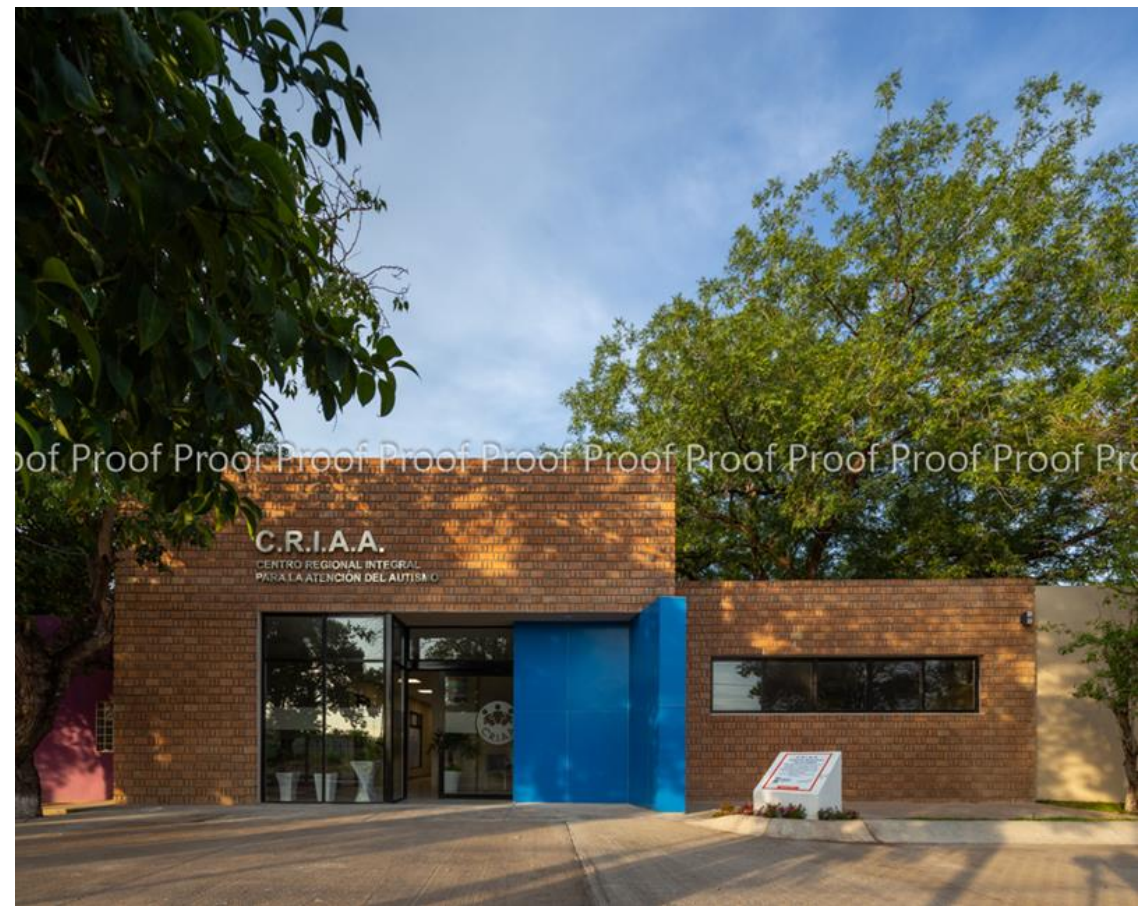
Sensory diet in patios, includes passage of time.

Based on a program of sensory activities to keep the nervous system calm, organized and focused and thus perform better in the environments in which you live: school, playground, classroom.

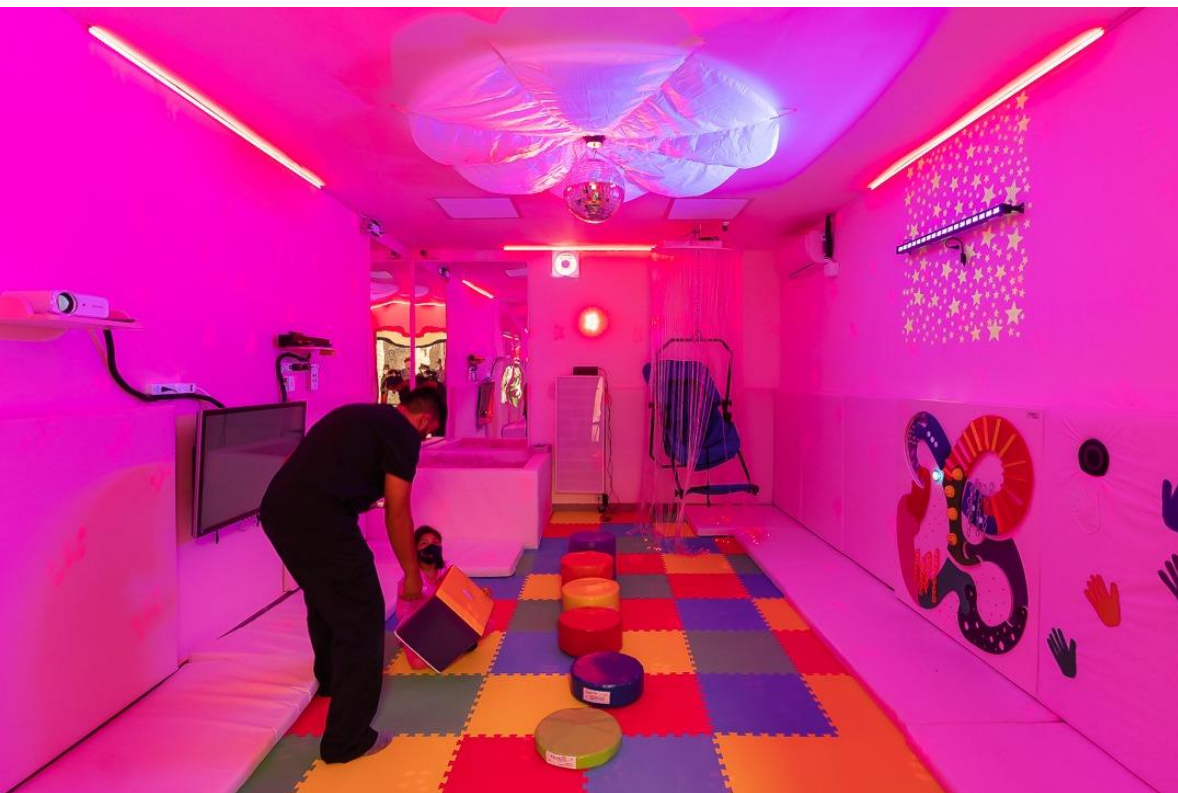
The Sensory Diet provides the child with opportunities to receive the inputs or sensory stimuli that he needs in his day-to-day life, thus allowing him to improve his functionality and participation.











Thank you!