

The Foundations of CVI-Rehabilitation



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This talk:

Two main points

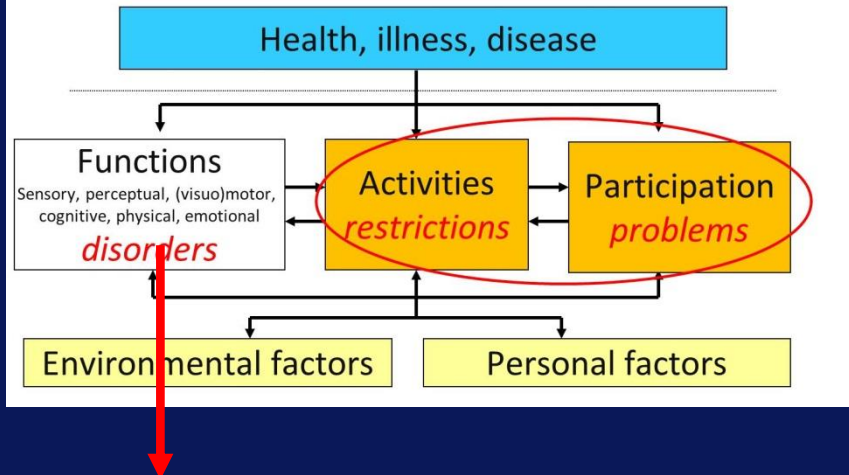


1. Good CVI-rehabilitation is based on the COMPLETE picture of the patient
2. The majority of the common CVI-symptoms (Nicola!) is caused by disorders in visual selective attention functions

CVI rehabilitation in Royal Dutch Visio is based on two cornerstones



1. International Classification of Functions (ICF, WHO)



2. Hierarchical model of human behavior with a neuropsychological core

- Emotions, motivations, needs and salience in outside world
- Executive functions
- General attentional functions
- Low visual functions
- **High visual functions:**
 - Visual selective attentional functions
 - Perceptual functions
 - Visuomotor functions
 - Visual memory functions
 - Visual working memory functions

▪ Motor

▪ Verbal

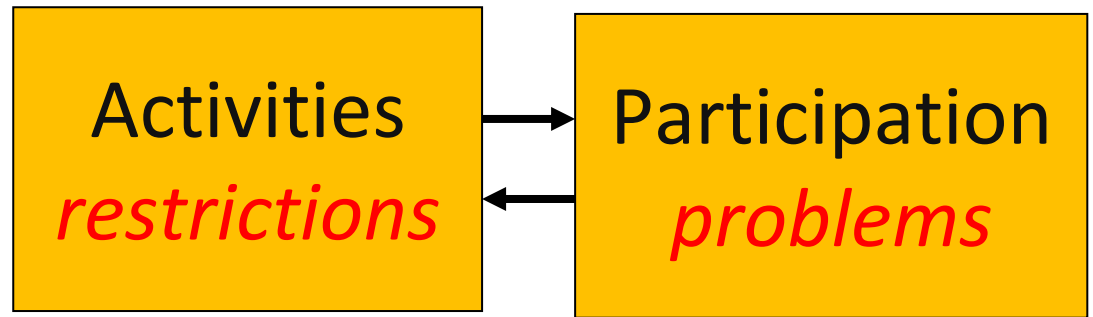
1. ICF helps

- to get a full list of problems/restrictions
- to understand all their causes and other relevant factors

2. Our neuropsychological model

- identifies all visual functions: high as well as low
- helps to understand visual functions as “part of a human being” :linking them to cognitive and emotional functions

1. International Classification of Functions (ICF, WHO)



- Helps to identify restrictions/problems in 9 life domains:

Rehabilitation in Royal Dutch Visio:



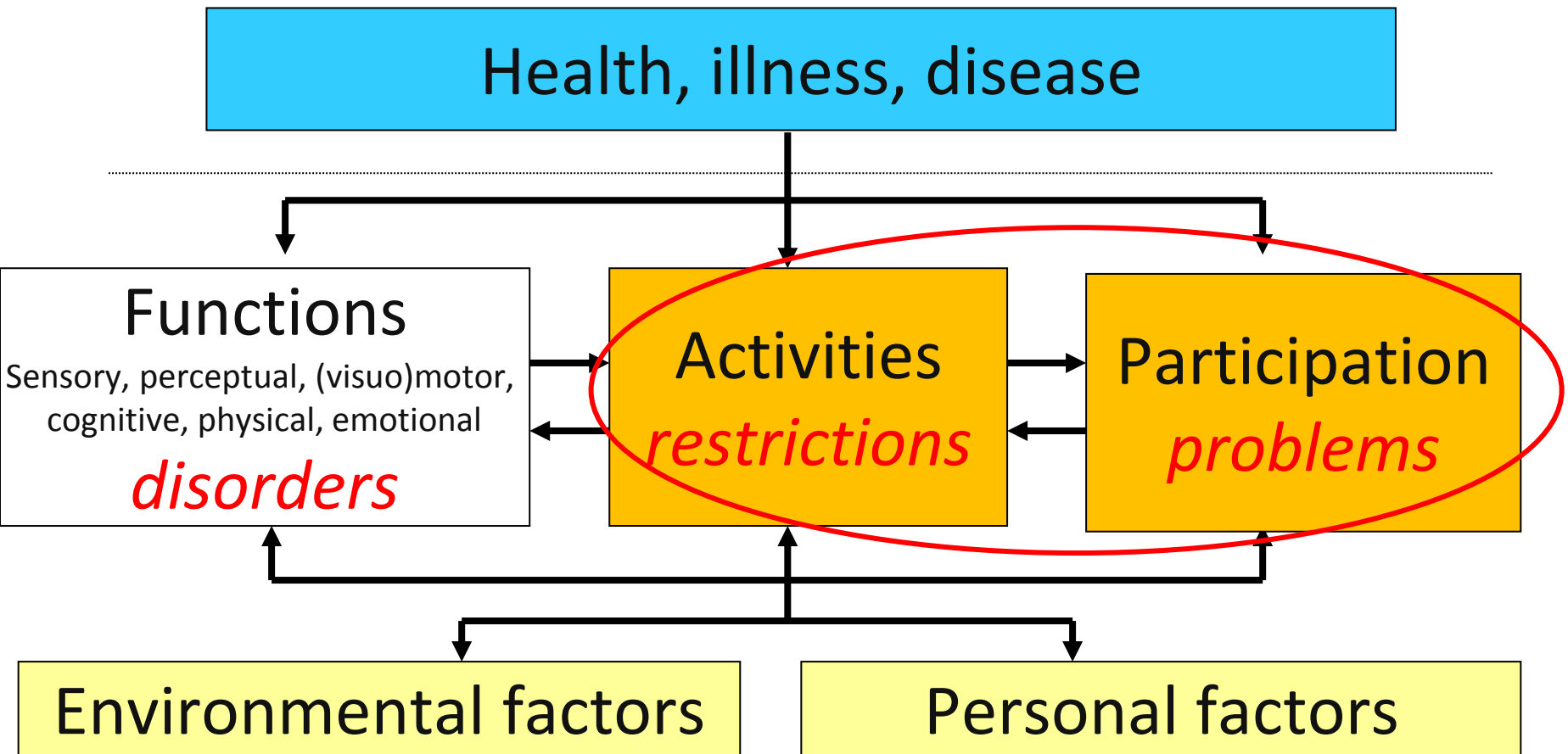
- Finding all problems and restrictions in all life domains,
- Trying to find their respective causes as well as the contributing and protective factors of a patient

ICF Life domains, which cover all aspects of life



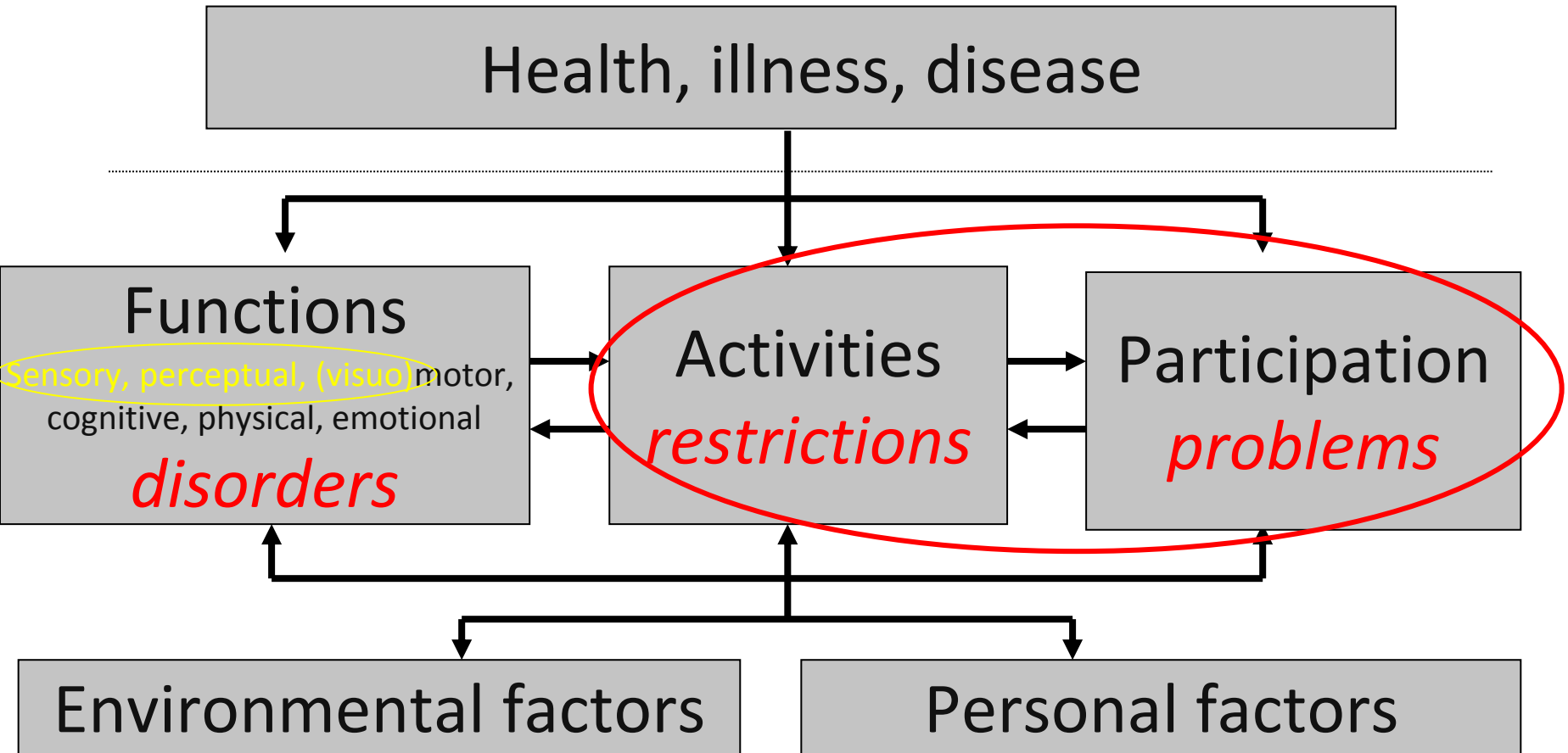
1. Learning and applying knowledge
2. General tasks and demands
3. Communication
4. Mobility
5. Self-care
6. Domestic life
7. Interpersonal interactions
8. Major life areas
9. Community, social and civil life

1. International Classification of Functions (ICF, WHO)

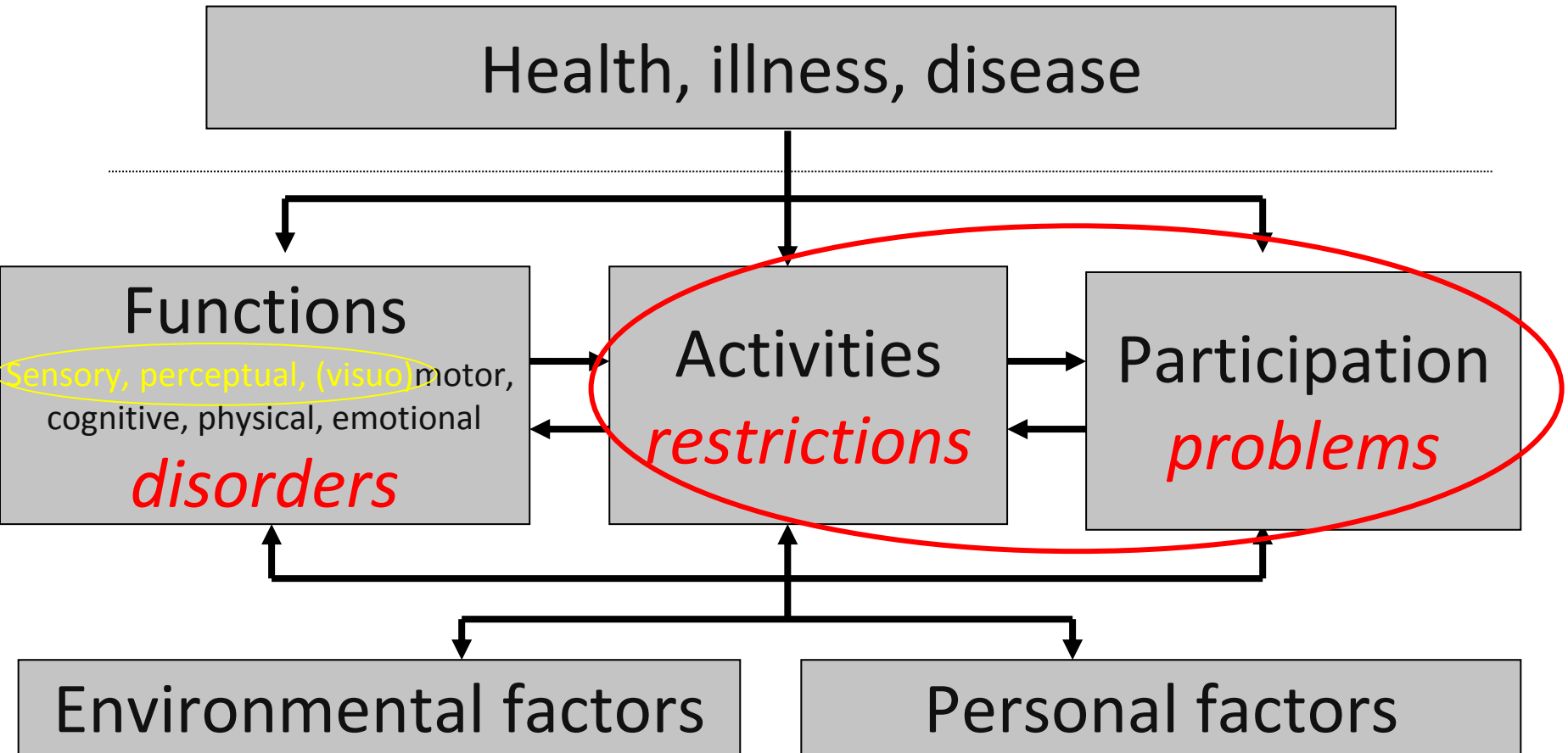


- Helps to identify restrictions/ problems in 9 life domains
- Provides the basis for an explanatory framework, pointing to:
Functions, general health, environmental and personal factors

ICF (WHO): visual functions (in yellow) are only one possible cause for restrictions and problems in daily life

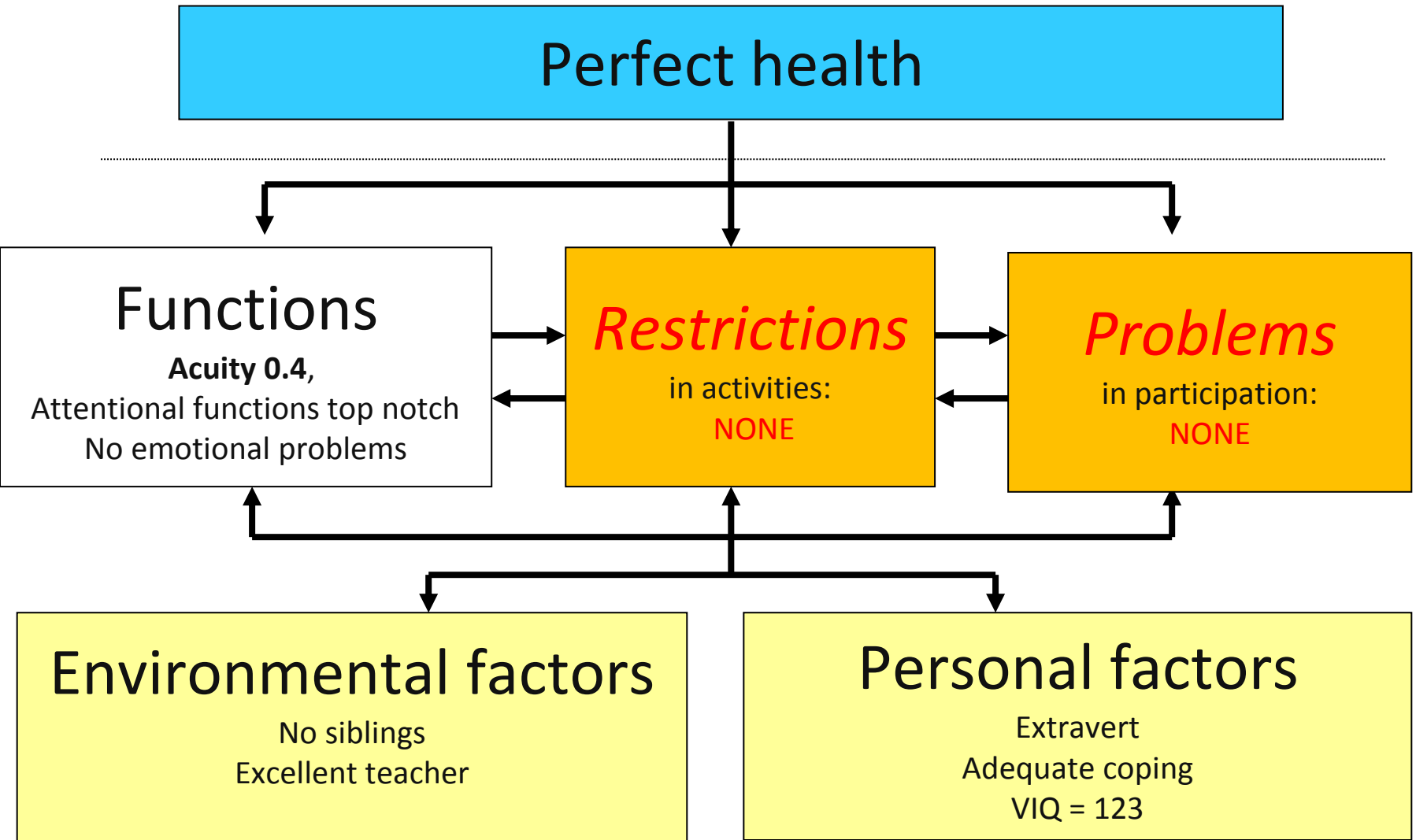


ICF (WHO): looking only at the contribution of visual functions (in yellow) would be a major shortcoming, particularly in CVI (comorbidity!)



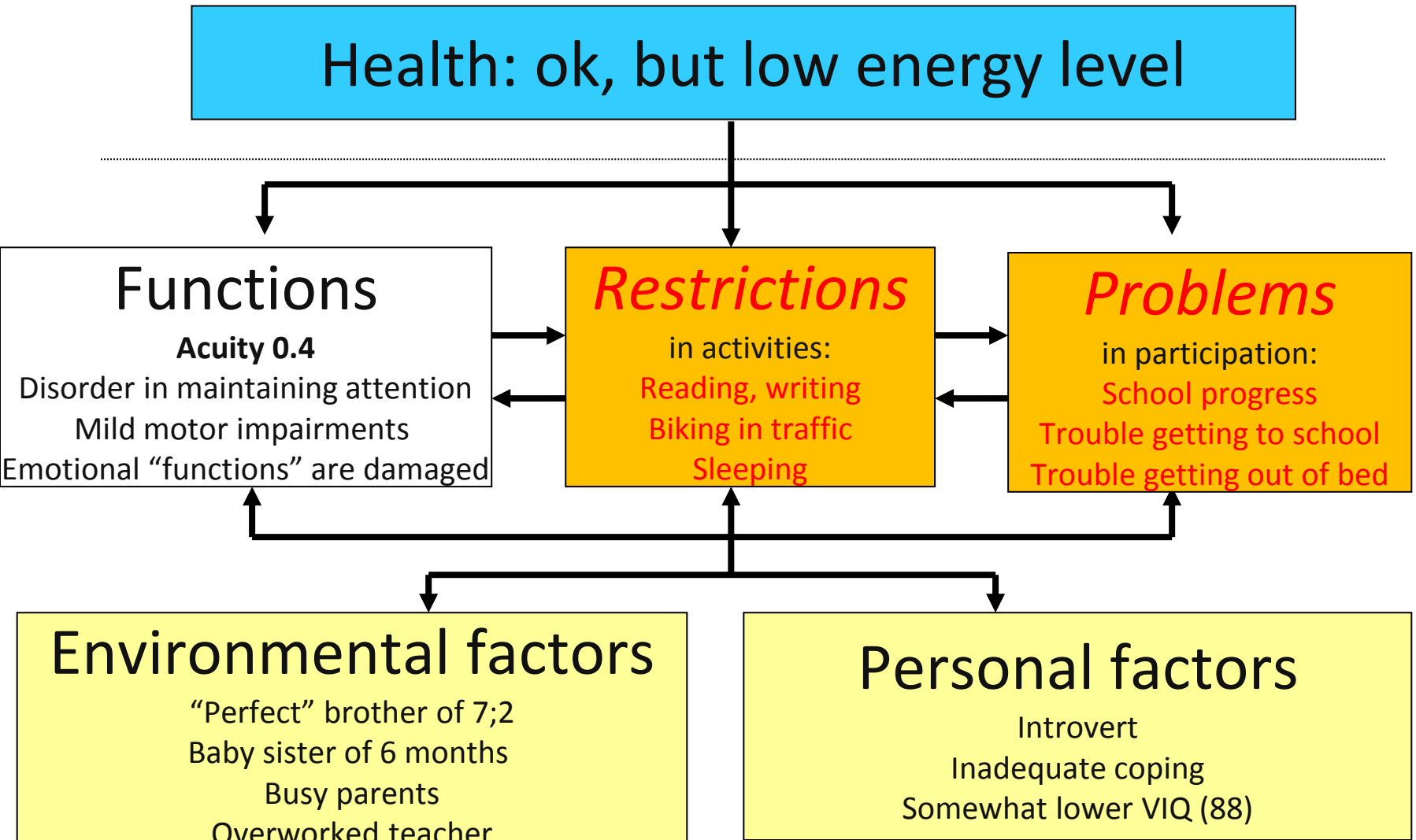
**Consider Andrew (8;4 y): acuity 0.4
(damage to optic radiations)**

Otherwise perfect possible contributing factors



**Now consider Brandon (8;4 y): also acuity 0.4
(damage to optic radiations)**

**Weaknesses in health, functions, environmental and personal
factors: RESTRICTIONS AND PROBLEMS**



This illustrates and explains that

1. Good CVI-rehabilitation is based on the complete picture of the patient
2. we need to explain and understand problems and restrictions in daily life in terms of
 - Functions (visual and general)
 - Personal and environmental factors
 - General health factors
 - And their interactions

ICF

This talk: Three main points

Now my next point



2. The majority of the most common CVI-symptoms (Nicola!) is caused by disorders in visual selective attention functions! (OUR NEUROPSYCHOLOGICAL MODEL)

Remember this scene?



And what Nicola sees?



Explanation: SIMULTANAGNOSIA?

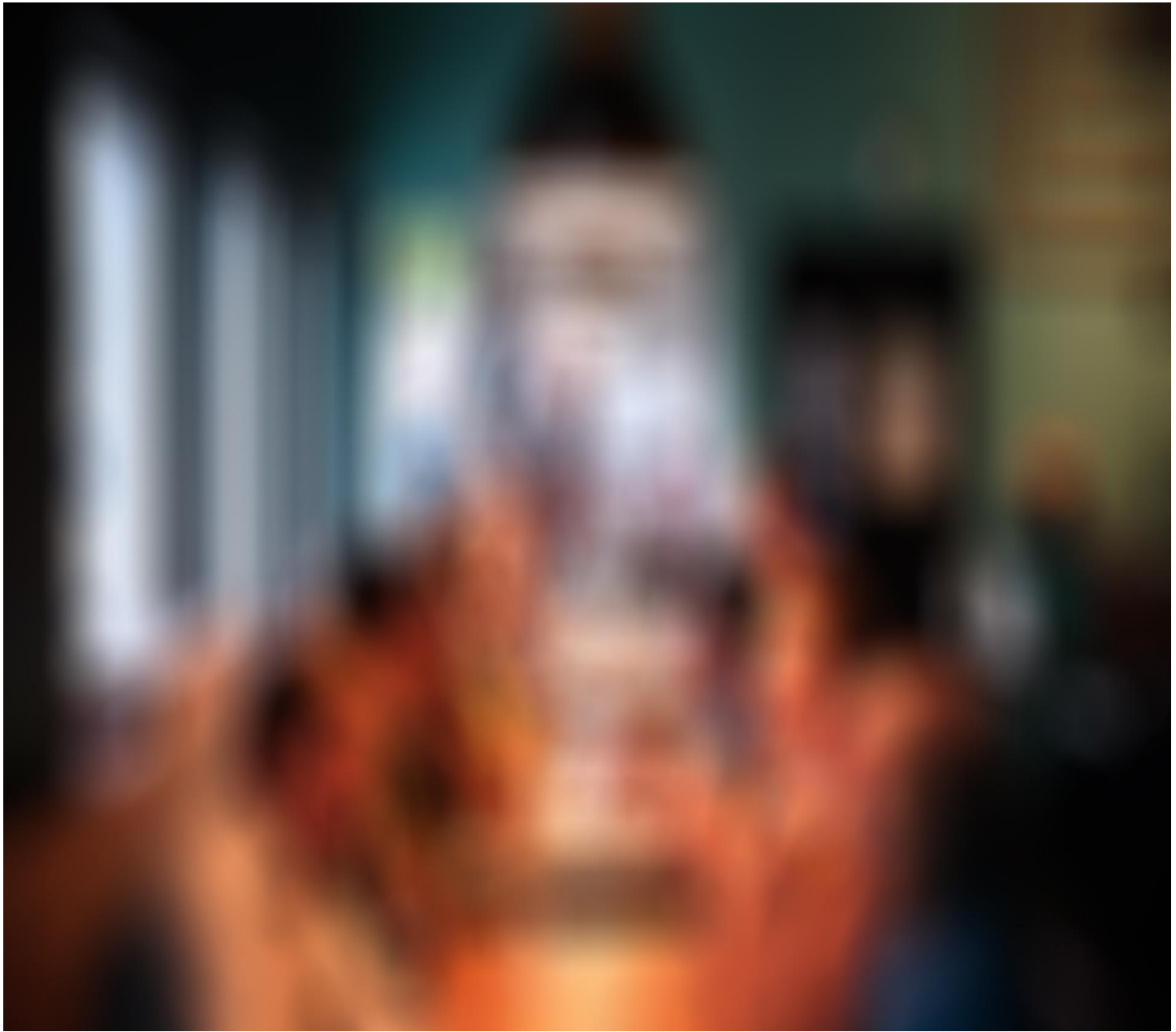
("can't see more than one detail at a time")

Problems with this label as a diagnostic explanation:

1. DESCRIPTION, not an explanation
2. Every detail contains multiple details



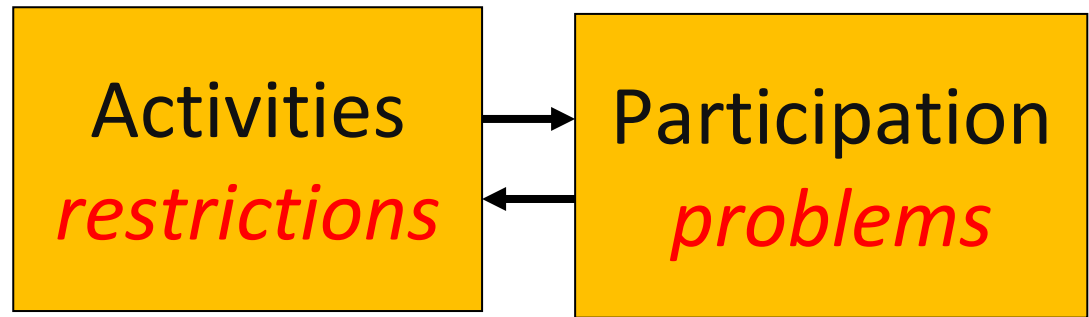




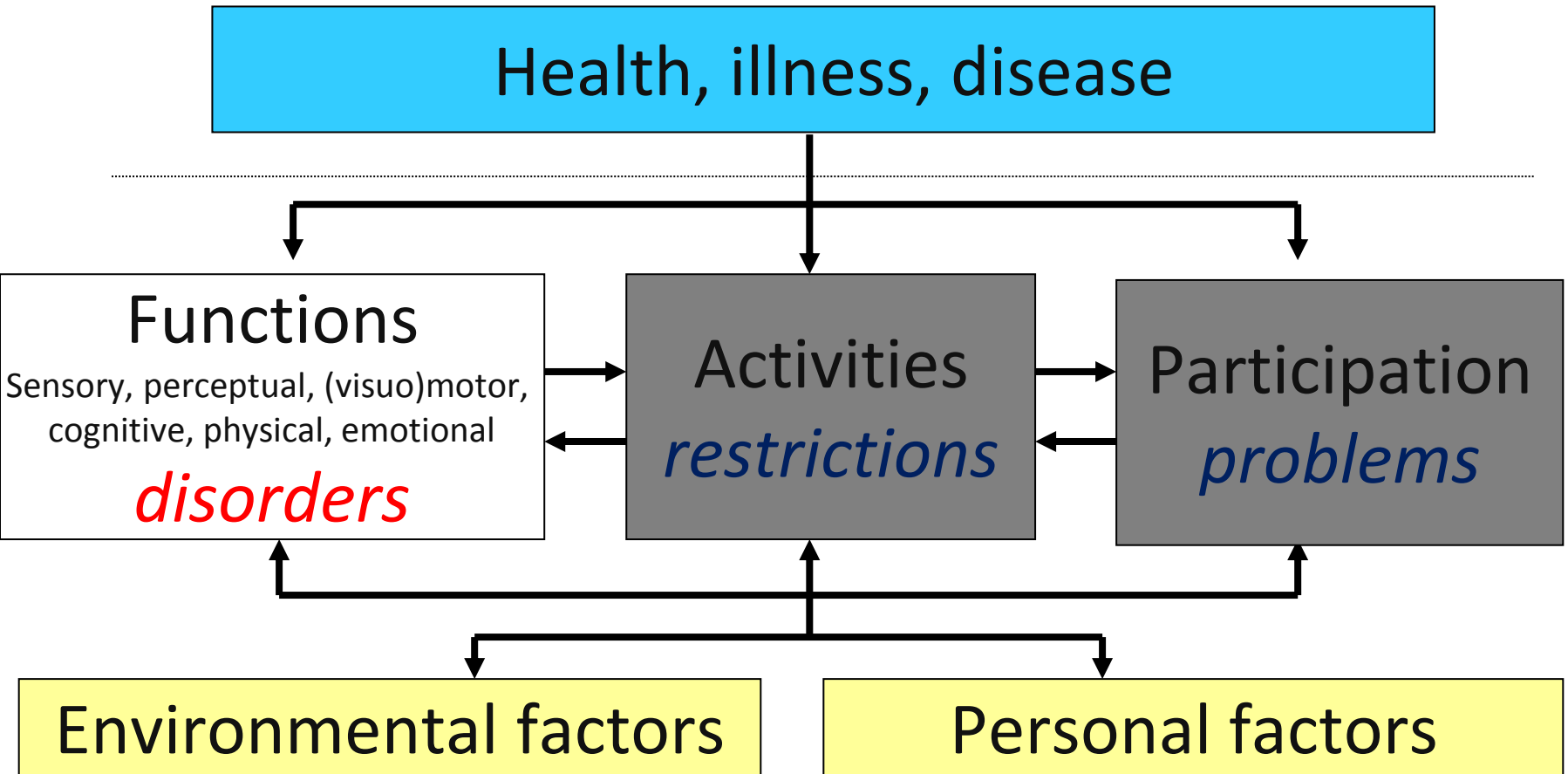
Explanation: "Visual clutter/central crowding?"
("Trouble seeing details in crowded visual environments")

Problems with this label as a diagnostic outcome:
DESCRIPTION, not an explanation

**Labels like “CVI”, “simulatagnosia” or “crowding”
DESCRIBE the restrictions and problems**



.. they don't EXPLAIN them!



Why not explain them? We know the underlying neuropsychological mechanisms



- What we see depends on what we SELECT

2. Hierarchical model of human behavior with a neuropsychological core

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**The majority
of CVI=patients**

**Look at the yellow dot and keep
looking at it while the next slide
appears**



**Without moving our eyes we can
see the whole car..**

Visio 



.. because we **select** the whole car
(we spread our attention over the car)



Global visual selective attention
Selection of a large part of the visual field



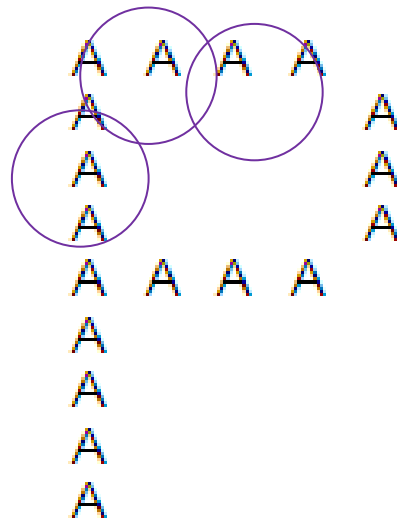
But if for some reason we are interested in the handle, we focus all our attention on the handle and see the handle



Local visual selective attention
Selecting a smaller area of the visual field:
"Zooming in"

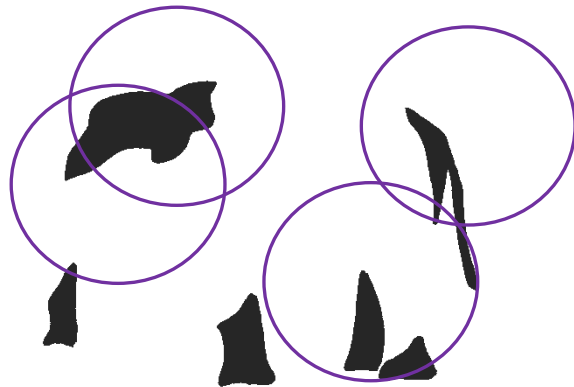


A disorder in **global visual selective attention** results in missing the whole



the patient only sees the A's because she selects the A's

A disorder in **global visual selective attention**) results in missing the whole



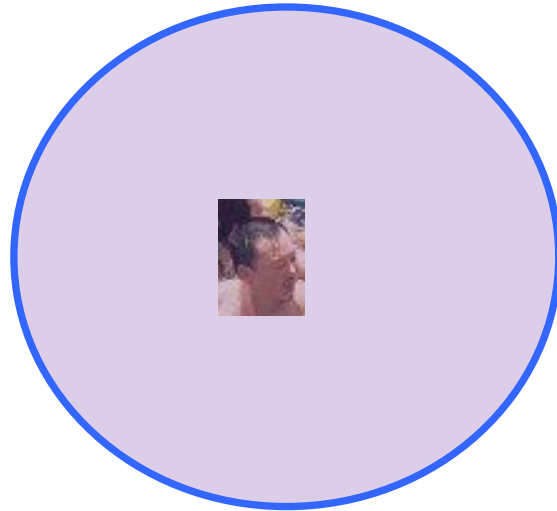
the patient only sees black shapes

A high-angle photograph of a massive crowd of people swimming in a pool. The water is filled with hundreds of people of various ages, many of whom are using colorful inflatable rings (blue, yellow, green, pink). The density of the crowd is very high, with people packed closely together. A blue circle is drawn in the center of the image, highlighting a specific group of people. The overall scene is one of a busy, crowded recreational activity.

Disorders in LOCAL visual selective attention:
The patient selects an area that is too big
which is a problem in crowded situations

You don't see your father's face
you see a chaos

Disorders in local visual selective attention:
The patient selects an area that is too big
which is a problem in crowded situations



* 2003, Best Picture, Best Director, Best Art Direction, Best Visual Effects, Best Writing (Adapted Screenplay), Best Film Editing, Best Costume Design, Best Makeup, Best Sound Mixing, Best Score, Best Song.

NEW LINE CINEMA PRESENTS A WINGNUT FILMS PRODUCTION "THE LORD OF THE RINGS: THE RETURN OF THE KING" ELIJAH WOOD IAN MCKELLEN LIV TYLER VIGGO MORTENSEN SEAN ASTIN CATE BLANCHETT JOHN RHYS-DAVIES BERNARD HILL BILLY BOYD DOMINIC MONAGHAN ORLANDO BLOOM HUGO WEAVING MIRANDA OTTO DAVID WENHAM KARL URBAN JOHN NOBLE FEATURING ANDY SERKIS AS GOLLUM WITH IAN HOLM AND SEAN BEAN UK CASTING BY JOHN HUBBARD AND AMY MACLEAN US CASTING BY VICTORIA BURROWS COSTUME DESIGNERS NGILA DICKSON RICHARD TAYLOR SPECIAL MAKE-UP, CREATURE, MINIATURE AND DIGITAL EFFECTS BY WETA LTD. NZ VISUAL EFFECTS SUPERVISOR JIM RYGIEL MUSIC BY HOWARD SHORE FEATURING "INTO THE WEST" PERFORMED BY ANNIE LENNOX FILM EDITOR JAMIE SELKIRK PRODUCTION DESIGNER GRANT MAJOR DIRECTOR OF PHOTOGRAPHY ANDREW LESNIE, A.C.S. CO-PRODUCERS RICK PORRAS JAMIE SELKIRK EXECUTIVE PRODUCERS MARK ORDESKY BOB WEINSTEIN HARVEY WEINSTEIN EXECUTIVE PRODUCERS ROBERT SHAYE MICHAEL LYNNE PRODUCERS BARRIE M. OSBORNE FRAN WALSH PETER JACKSON BASED ON THE BOOK BY J.R.R. TOLKIEN SCREENPLAY BY FRAN WALSH & PHILIPPA BOYENS & PETER JACKSON DIRECTED BY PETER JACKSON SOUNDTRACK AVAILABLE ON  

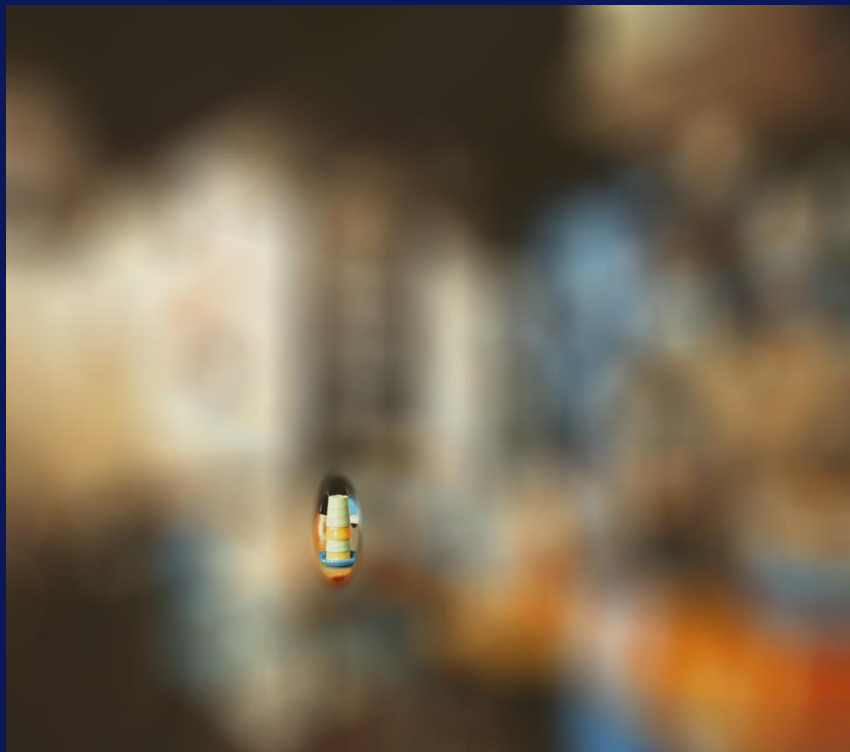
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The patient doesn't see the words
She sees **chaos**

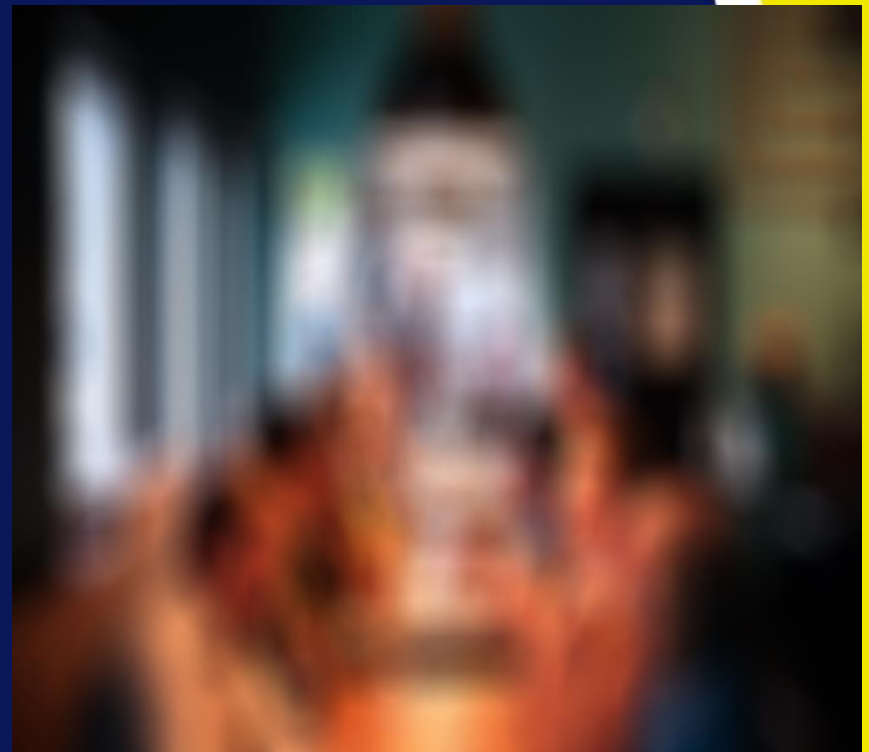
Does Nicola have disorders in visual selective attention?



Global?



Local?



Maybe.. Again, we need the complete picture.

Selection depends on:



- Saliency in the outside world
- Quality of our exogenous attentional functions (SC)
- Where we want to look at (intentions, needs, motivations, emotional factors)
- Quality of our endogenous attentional control (executive functions and FEF)
- Quality of our general attentional functions
- Quality of our oculomotor functions
- Quality of our sensory functions
- .. And on the quality of our global and local visual selective attention functions

And we need even more information: ICF (the complete picture!)



Attention(al) control depends on

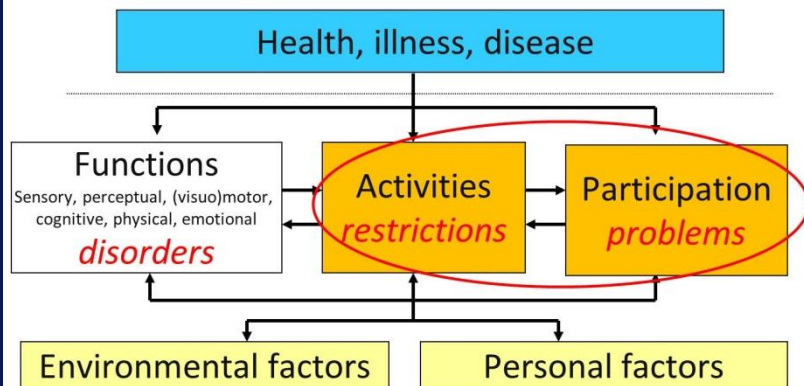
- Alertness
- Energy level
- General Health
- Sleep
- Emotional state
- Stress
- Environmental factors
- Personal and motivational factors
- Strong points

Successful rehabilitation
requires understanding
the relationships between
these factors in a
hierarchical way AND
relating them to everyday
life

Our rehabilitation of CVI-patients is based on only two cornerstones to provide the complete picture, but..



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But it is a very complex process: we sometimes need as many as all of our 17 disciplines to complete the picture

•Motor

•Verbal