

# Assessing ageing and cognition prospectively: where to focus?



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# Objectives

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- Define concept of aging
- From the perspective of cognition, define aging trajectories
  - Healthy aging
  - Cognitive disorders
- Describe variables associated to aging process: The Cognitive reserve
- Summary and discussion



To age...





# „to age“

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From a geriatric point of view:

- Highly complex process, it produces changes in different dimensions of life
  - Cognition for example
- It affects persons in a very different way
- It is a long term phenomena, in humans it takes decades

# Seattle Longitudinal Study

Design: 1956 - 1998

## Study Waves

1956	1963	1970	1977	1984	1991	1998
<b>S<sub>1</sub>T<sub>1</sub></b> (N = 500)	<b>S<sub>1</sub>T<sub>2</sub></b> (N = 302)	<b>S<sub>1</sub>T<sub>3</sub></b> (N = 163)	<b>S<sub>1</sub>T<sub>4</sub></b> (N = 130)	<b>S<sub>1</sub>T<sub>5</sub></b> (N = 97)	<b>S<sub>1</sub>T<sub>6</sub></b> (N = 75)	<b>S<sub>1</sub>T<sub>7</sub></b> (N = 38)
	<b>S<sub>2</sub>T<sub>2</sub></b> (N = 997)	<b>S<sub>2</sub>T<sub>3</sub></b> (N = 419)	<b>S<sub>2</sub>T<sub>4</sub></b> (N = 333)	<b>S<sub>2</sub>T<sub>5</sub></b> (N = 225)	<b>S<sub>2</sub>T<sub>6</sub></b> (N = 163)	<b>S<sub>2</sub>T<sub>7</sub></b> (N = 104)
		<b>S<sub>3</sub>T<sub>3</sub></b> (N = 705)	<b>S<sub>3</sub>T<sub>4</sub></b> (N = 337)	<b>S<sub>3</sub>T<sub>5</sub></b> (N = 224)	<b>S<sub>3</sub>T<sub>6</sub></b> (N = 175)	<b>S<sub>3</sub>T<sub>7</sub></b> (N = 127)
			<b>S<sub>4</sub>T<sub>4</sub></b> (N = 612)	<b>S<sub>4</sub>T<sub>5</sub></b> (N = 293)	<b>S<sub>4</sub>T<sub>6</sub></b> (N = 203)	<b>S<sub>4</sub>T<sub>7</sub></b> (N = 136)
				<b>S<sub>5</sub>T<sub>5</sub></b> (N = 629)	<b>S<sub>5</sub>T<sub>6</sub></b> (N = 427)	<b>S<sub>5</sub>T<sub>7</sub></b> (N = 266)
					<b>S<sub>6</sub>T<sub>6</sub></b> (N = 693)	<b>S<sub>6</sub>T<sub>7</sub></b> (N = 406)
						<b>S<sub>7</sub>T<sub>7</sub></b> (N = 719)

S = Sample, T = Time-of-measurement



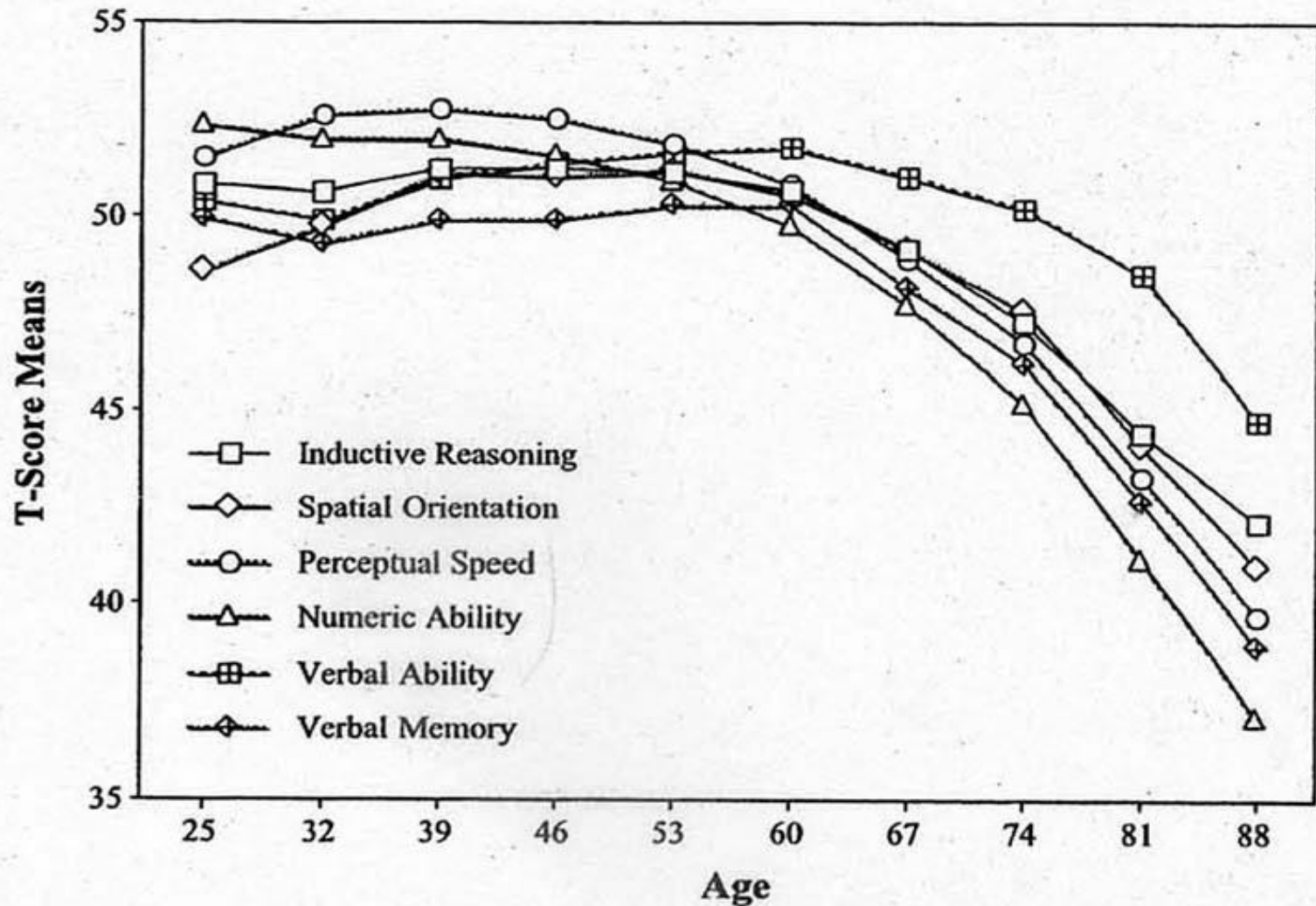
# Which cognitive domains?

**Table 1**

Psychometric Intelligence Measurement Battery.

Primary ability	Test	Source	Test-retest correlation
Inductive Reasoning	PMA Reasoning (1948)	Thurstone & Thurstone (1949)	.884
	ADEPT Letter Series (Form A)	Blieszner et al. (1981)	.839
	Word Series	Schaie (1985)	.852
	Number Series	Ekstrom et al. (1976)	.833
Spatial Orientation	PMA Space (1948)	Thurstone & Thurstone (1949)	.817
	Object Rotation	Schaie (1985)	.861
	Alphanumeric Rotation	Willis & Schaie (1983)	.820
	Cube Comparisons	Ekstrom et al. (1976)	.951
Numerical Ability	PMA Number (1948)	Thurstone & Thurstone (1949)	.875
	Addition (N-1)	Ekstrom et al. (1976)	.937
	Subtraction & Multiplication (N-3)	Ekstrom et al. (1976)	.943
Verbal Comprehension	PMA Verbal Meaning (1948)	Thurstone & Thurstone (1949)	.890
	ETS Vocabulary (V-2)	Ekstrom et al. (1976)	.928
	ETS Advanced Vocabulary (V-4)	Ekstrom et al. (1976)	.954
Perceptual Speed	Identical Pictures	Ekstrom et al. (1976)	.814
	Finding A's	Ekstrom et al. (1976)	.860
	Number Comparison	Ekstrom et al. (1976)	.865
Verbal Memory	Immediate Recall	Zelinski et al. (1993)	.820
	Delayed Recall	Zelinski et al. (1993)	.732
	PMA Word Fluency	Thurstone & Thurstone (1949)	.896

# Seattle Longitudinal Study





# Evaluación cognitiva MAUCO

ADDENBROOKE'S COGNITIVE EXAMINATION - ACE-R							
Final Revised Version A (2005)							
Name : Date of birth : Hospital no. :				Date of testing: ...../...../..... Tester's name: ..... Age at leaving full-time education: ..... Occupation: ..... Handedness: .....			
Addressograph							
ORIENTATION							
➤ Ask: What is the	Day	Date	Month	Year	Season	[Score 0-5] <input type="checkbox"/> <input type="checkbox"/>	z o

- Mini Mental (MMSE)=30 puntos
- Addenbrooke's (ACE-R)=100 puntos
- Trail Making Test A y B

## Dominios cognitivos

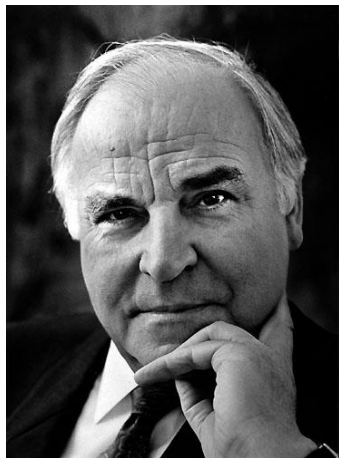
- Orientación y atención
- Memoria
- Habilidades Visoespaciales
- Lenguaje
- Función ejecutiva

# Cognitive disorder or not

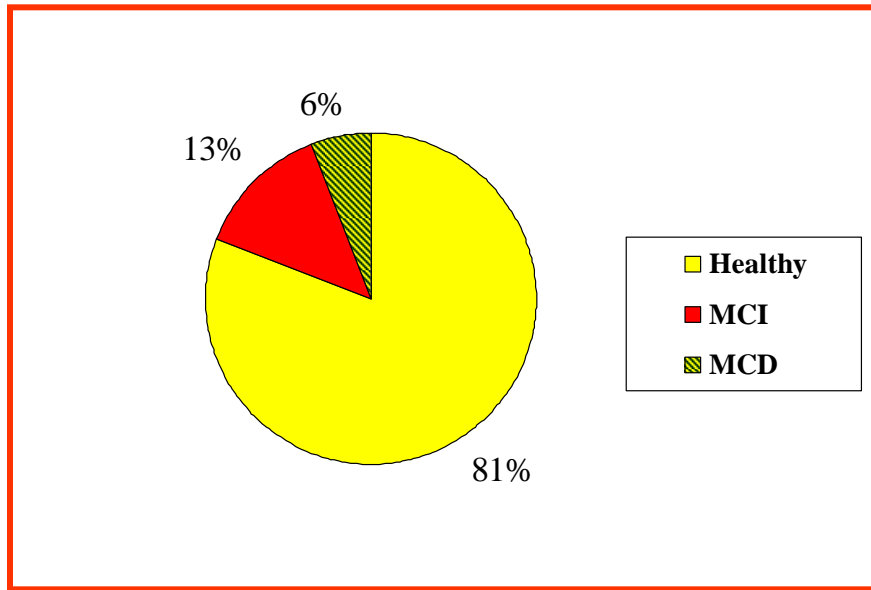
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- Normal aging
  - No changes in functionality
- Cognitive disorders
  - Minor or mild (changes in functionality)
    - Due to a medical condition
    - Due to probable Alzheimer's Disease
  - Major (dementias)
    - Alzheimer's Disease
    - Vascular Disease and others

# Interdisciplinary Longitudinal Study of Aging (ILSE)

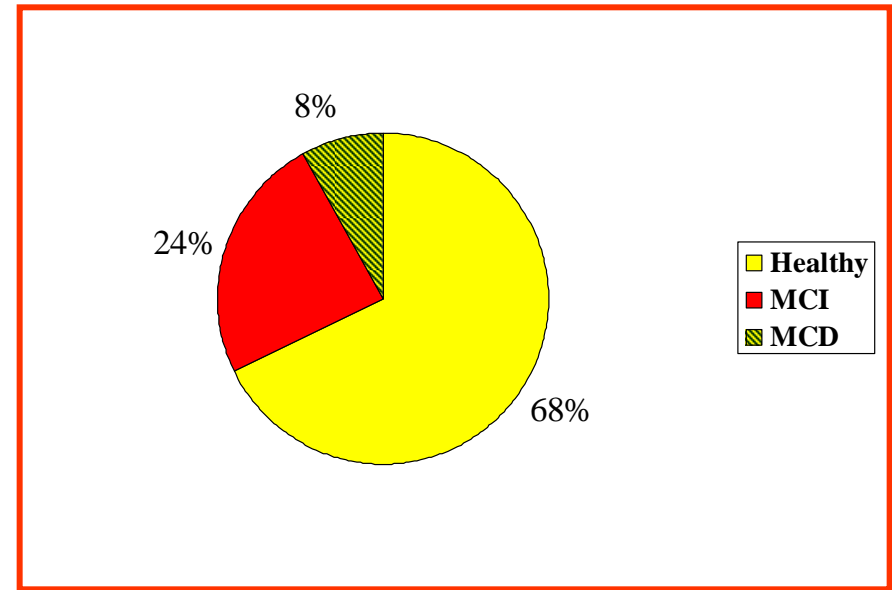


# Prevalence of cognitive disorders



## 1. Examination

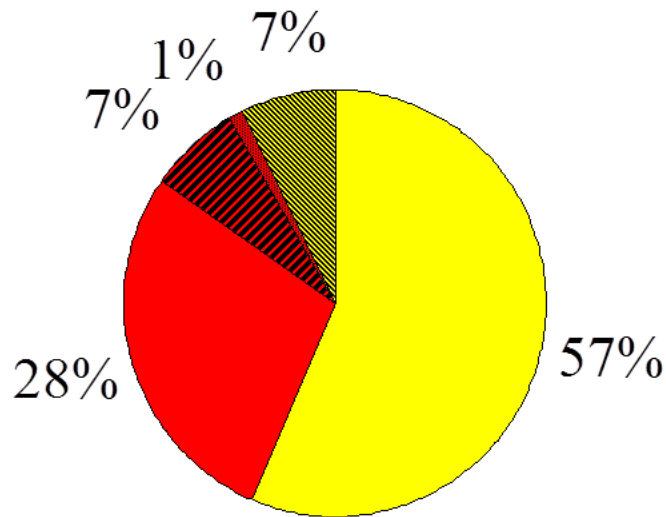
N= 500, Age= 62 years



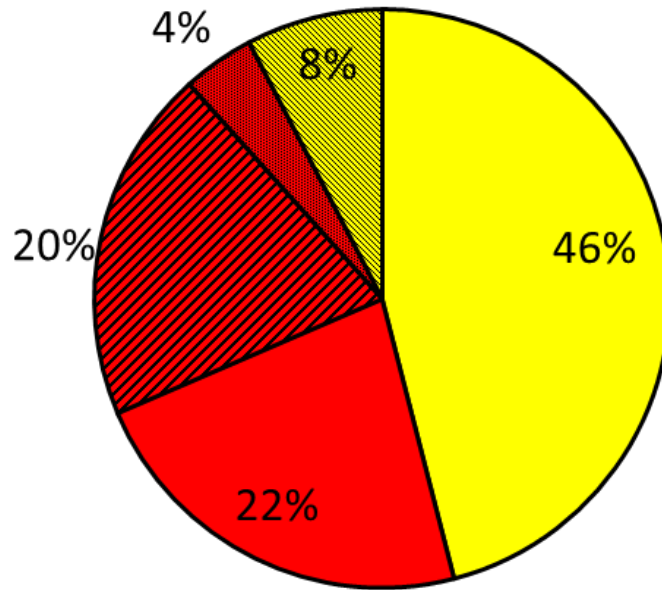
## 2. Examination

n=449 Age= 68 years

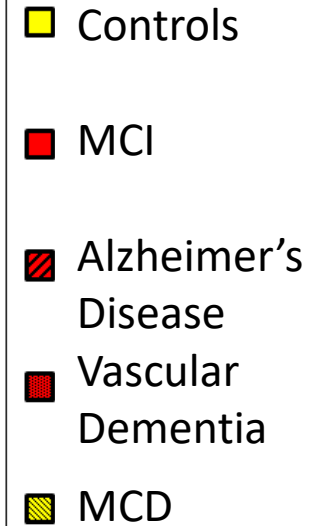
# Prevalence of cognitive disorders



3. Examination  
N=381, Age: 75 years



4. Examination  
N=248, Age: 84 years





# Risk & protective factors

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- Education and bilingualism (Schröder & Sattler, 2012)
- Cognitive demands in professional life and leisure activities (Sattler et al. 2010)
- Physical activity (Sattler et al. 2010)
- Personality/attitudes towards own aging (Siebert et al., 2017 and Kuzma et al., 2012)
- Medical conditions
  - » Diabetes Mellitus 2 (Toro et al., 2010 and Degen et al., 2016)
  - » Hypercholesterolemia (Toro et al., 2014)
- Genetic Polymorphisms (Degen et al., 2016)
- Changes in brain structure by MRI (Thomann et al., 2013)

# Which trajectory?

## Cognitive Reserve: focus on prevention



- Cognitive activity
- Physical activity
- Food and diet
- Chronic diseases
- Personality traits

# Discussion

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- Cognitive performance in longitudinal studies
  - 5 Cognitive domains: Attention, language, memory, executive functions, visuospatial
  - Need for normative data?
- Cognitive reserve is a focus
  - Affects cognitive performance and aging trajectory
  - Education, income, physical and cognitive activities, diet, chronic diseases

Gracias por su atención!

