

UNIVERSITÀ
DI PAVIA

HEALTHY AGING

Elena Cavallini
Università degli Studi di Pavia

All4AD - Alliance for Alzheimer's Disease and other Dementias
Pavia, October 5th, 2019

Healthy Ageing

is about creating the environments and opportunities that enable people to be and do what they value throughout their lives.

- Everybody can experience *Healthy Ageing*.
- Being free of disease or infirmity is not a requirement for *Healthy Ageing* as many older adults have one or more health conditions that, when well controlled, have little influence on their wellbeing.

World Health Organization

World Health Organization

defines *Healthy Ageing* “as the process of developing and maintaining the **functional ability** that enables **wellbeing** in older age”.

Functional ability is about having the capabilities that enable all people to be and do what they have reason to value. This includes a person’s ability to:

- meet their basic needs;
- to learn, grow and make decisions;
- to be mobile;
- to build and maintain relationships; and
- to contribute to society.

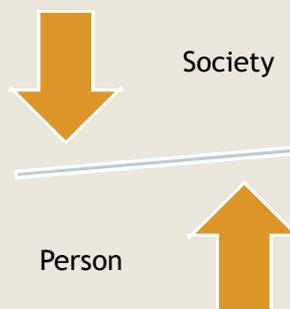
Functional ability is made up of the **intrinsic capacity** of the individual, relevant **environmental characteristics** and the interaction between them.

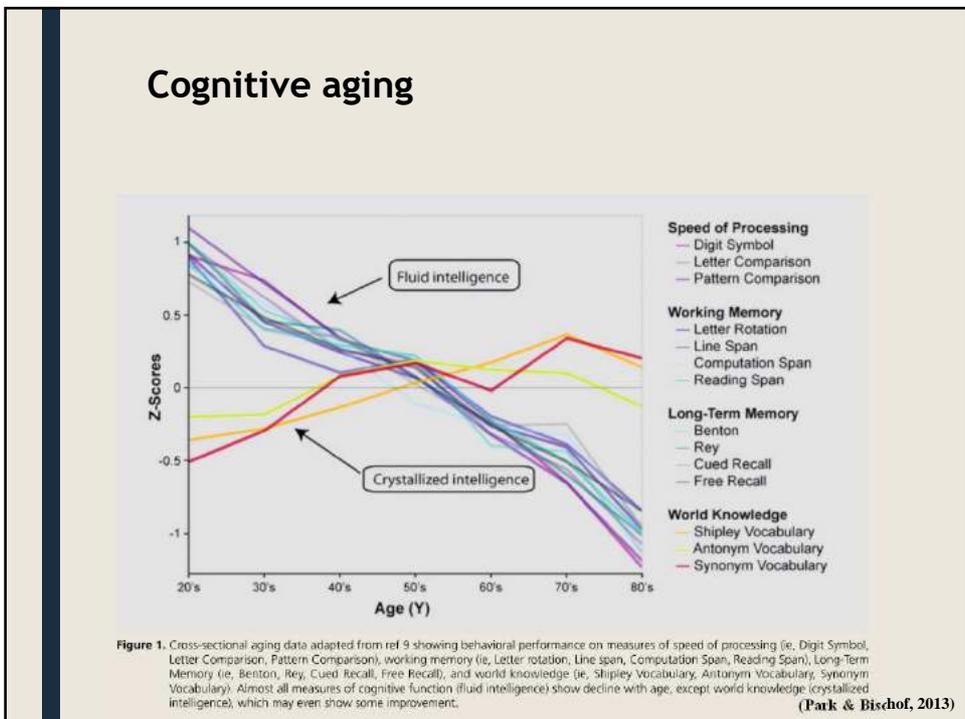
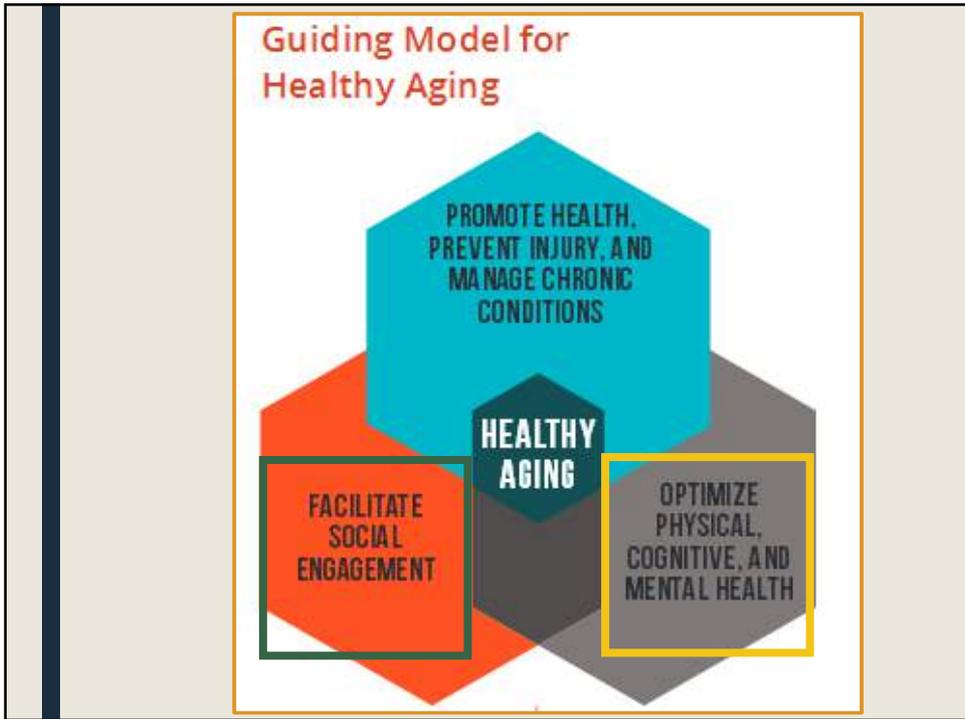
Age-friendly environments

Health and well-being are determined not only by our genes and personal characteristics but also by the **physical and social environments** in which we live our lives.

Environments play an important role in determining our physical and mental capacity across a person’s life course and into older age and also how well we adjust to loss of function and other forms of adversity that we may experience at different stages of life, and in particular in later years.

World Health Organization





Can we delay the decline?

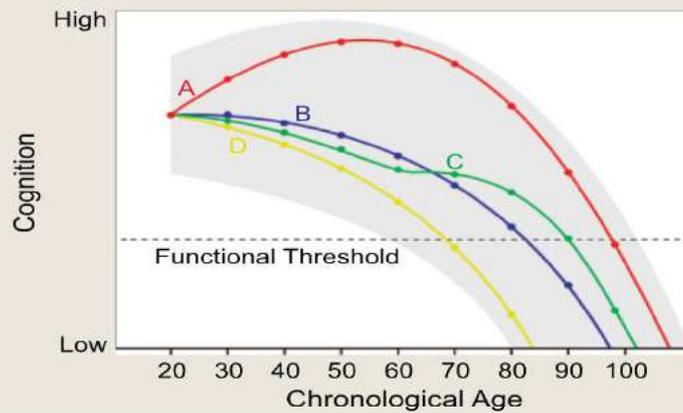


Fig. 2. Depiction of the zone of possible cognitive development for a given individual, along with four developmental curves (A, B, C, & D) indicating specific possible outcomes. Each possible curve starts from the same functional level at age 20, with different trajectories resulting as a function of interactions among behavioral, environmental, and genetic factors that permit vertical movement within the zone at different points in the life span.

(Hertzog et al., 2008)

Scaffolding Theory of Aging and Cognition

A Life Course Model of The Scaffolding Theory of Aging and Cognition (STAC-R)

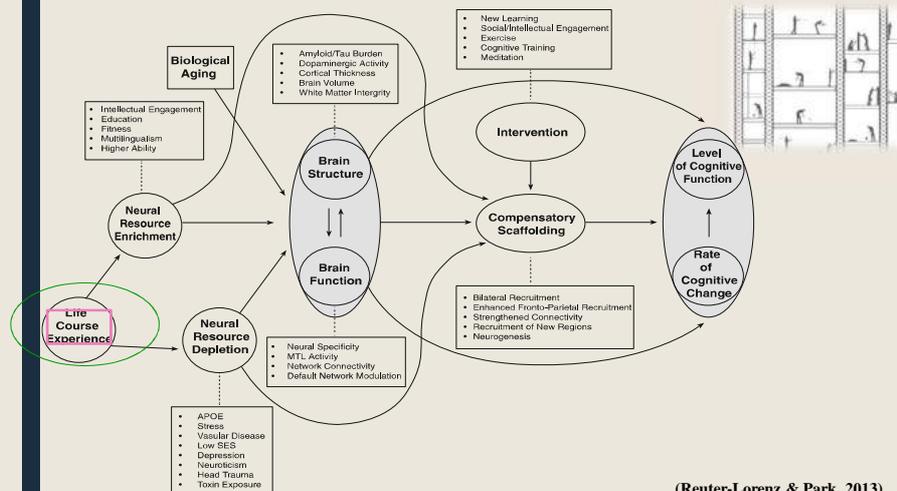
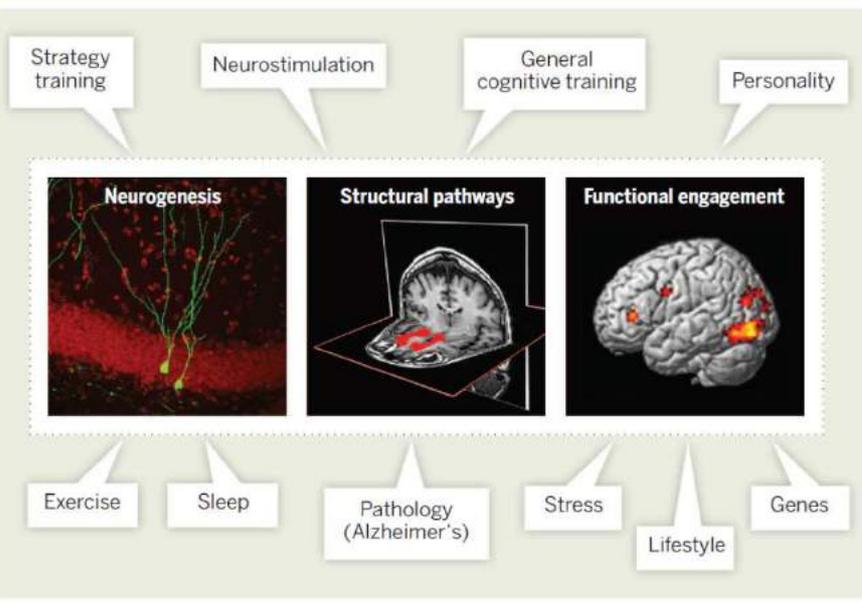


Fig. 2 A conceptual model of the scaffolding theory of aging and cognition-revised (STAC-r)

(Reuter-Lorenz & Park, 2013)

Plasticity in aging



Education

Expertise

Life style

Interventions

Cognitive and mental health

Education

Psychology and Aging
2018, 33(4), 521-530
doi:10.1037/xap0000167

Associations Between Education and Age-Related Cognitive Changes From Early Adulthood to Late Midlife

Mette Gustafsson
University of Copenhagen

Mette Oline
University of Copenhagen and Hvidovre Hospital, Copenhagen, Denmark

Tine Flathberg-Madsen
University of Copenhagen

Hilge J. Sørensen
University of Copenhagen and Copenhagen University Hospital, Gentofte, Denmark, Denmark

Erik L. Morsman
University of Copenhagen

Table 4
Predicted Mean BPP Slopes for Various Baseline BPP Scores and Years of Education in 1,543 Danish Men

Variables	Years of education			B _{year} ^a
	11 years	13 years	15 years	
Baseline BPP scores				
Low (SD)	.32 (.30)	1.76 (.30)	3.01 (.44)	.21 (p < .001)
Middle (SD)	-5.36 (.22)	-2.51 (.16)	-1.65 (.10)	.28 (p < .001)
High (SD)	7.25 (.58)	-8.71 (.50)	-6.30 (.26)	.03 (p = .228)

Note. BPP = Bergin Praxis Probe (intelligence test). Data are mean (SD).
^aMultiple-group SEM analyses of the BPP slope with years of education were calculated in three BPP groups: low (<41), middle (41–50), and high (≥51) adjusted for year of birth, sex, interval, and baseline BPP.

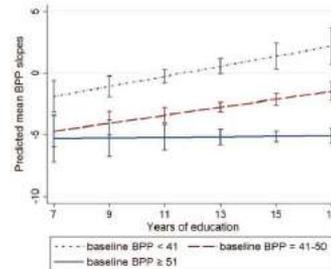


Figure 2. Predicted mean BPP slopes for various years of education within three groups of baseline BPP scores in 1,543 Danish men. BPP = Bergin Praxis Probe (intelligence test). See the online article for the color version of this figure.

EXPERTISE



RESEARCH ARTICLE

Musical practice as an enhancer of cognitive function in healthy aging - A systematic review and meta-analysis

Rafael Román-Caballero^{1*}, Marisa Arnedo², Mónica Triviño^{1,3}, Juan Lupiáñez^{1,4}

1 Mind, Brain and Behavior Research Center (CIMCYC), University of Granada, Granada, Spain, **2** Department of Psychobiology, University of Granada, Granada, Spain, **3** San Rafael University Hospital, Granada, Spain, **4** Department of Experimental Psychology, University of Granada, Granada, Spain
 PLOS ONE | <https://doi.org/10.1371/journal.pone.0207987> November 27, 2018

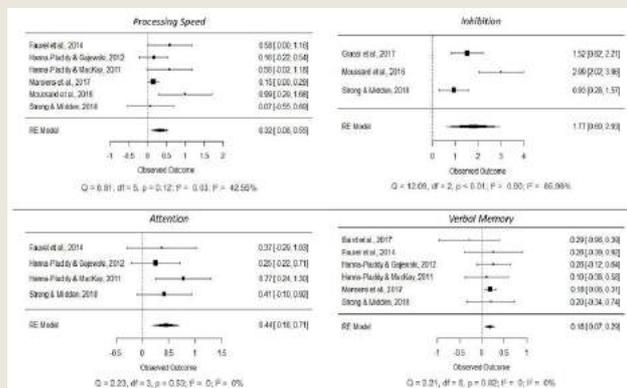


Fig 4. Forest plots showing cognitive improvements in processing speed, attention, inhibition and verbal memory in older adults associated with long-term musical practice.

The effect of age and professional expertise on working memory performance

Table 2. *F* tests for age and expertise main effects and for age × expertise interaction effect

Tests	Age	Expertise	Age × expertise
Visuo-spatial tests			
Corsi Block Test	22.38** (1 > 2 > 3)	11.22**	0.79
Visual Pattern Test	44.52** (1 > 2 > 3)	22.16**	0.96
Mental Pathway Test	22.35** (1 > 2 > 3)	8.77**	2.94
Jigsaw Puzzle Test	37.71** (1 > 2 > 3)	49.07**	2.37
Verbal Tests			
Digit Span	10.82** (1 > 2, 3)	4.21*	2.09
Verbal Span	18.83** (1 > 2 > 3)	1.27	0.26
Word Generation Test	6.54** (1, 2 > 3)	10.34**	0.19
Listening Span Test	12.82** (1, 2 > 3)	6.00*	0.11

Architects

“Literary” people

Table 5. *F* test for age and expertise main effects and for age × expertise interaction effect

Test	Age	Expertise	Age × expertise
Verbal Tests			
Digit Span	5.79** (1, 2 > 3)	4.55*	0.03
Verbal Span	13.87** (1 > 2, 3)	10.56**	1.88
Word Generation Test	12.25** (1, 2 > 3)	4.58*	1.16
Listening Span Test	31.14** (1 > 2 > 3)	2.24	1.21
Visuo-spatial tests			
Corsi Block Test	11.69** (1, 2 > 3)	4.04*	2.38
Visual Pattern Test	28.66** (1 > 2 > 3)	9.06**	0.08
Mental Pathway Test	13.14** (1 > 2, 3)	8.86**	0.13
Jigsaw Puzzle Test	33.72** (1 > 2 > 3)	9.71**	0.69

Cavallini, Vecchi & Cornoldi (2009)

Life style

Quality of Life Research (2018) 27:3281–3292
<https://doi.org/10.1007/s11136-018-1971-8>



How you live is how you feel? Positive associations between different lifestyle factors, cognitive functioning, and health-related quality of life across adulthood

Caroline Cohrdes¹ · Gert B. M. Mensink¹ · Heike Hölling¹

Accepted: 16 August 2018 / Published online: 22 August 2018
 © Springer Nature Switzerland AG 2018

Abstract

Purpose Self-reported health-related quality of life (HRQoL) represents one central indicator for the need of prevention or intervention with gaining importance for public health monitoring. As part of this framework, the present study aims to identify potentially supportive factors of HRQoL and to determine age-related differences.

Methods In a sample of young to older adults (18–79 years; $M = 52.71$, $SD = 16.06$) from the German Health Interview and Examination Survey for Adults (DEGSI subsample, $n = 3667$, 52% female), we investigated interrelations between individual (e.g., chronic condition), social (e.g., social support), and lifestyle factors (e.g., healthy eating) and executive functioning with the physical composite scale (PCS) and the mental composite scale (MCS) of HRQoL with the help of path analyses. Secondly, we performed multiple regression analyses to determine age interactions.

Results Results suggest direct and indirect paths on PCS, respectively, MCS from various lifestyle factors and executive functioning in addition to individual and social factors with a good model fit (PCS: $CD = .63$, $SRMR = .001$; MCS: $CD = .64$, $SRMR = .003$). Furthermore, results suggest physical activity and healthy eating to become particularly relevant with advancing age (age group × physical activity on PCS, $\beta = .09$, $p < .05$; age group × healthy eating on MCS, $\beta > .50$, $p < .01$).

Conclusions Several lifestyle factors and executive functioning offer the potential to promote HRQoL in the everyday life of individuals at various ages, independent of individual or social determinants. Public health action might want to foster behavioral multicomponent approaches supporting healthy aging.

Interventio

Cognitive training

one of the most prominent interventions aimed at combating age-related cognitive decline.



Strategy-based training

Journal of Experimental Psychology: Applied
2013, Vol. 19, No. 3, 295–310

© 2013 American Psychological Association
1076-890X/13/\$12.00 DOI: 10.1037/xap0000071

The Importance of Training Strategy Adaptation: A Learner-Oriented Approach for Improving Older Adults' Memory and Transfer

Sara Bottiroli
Brain Connectivity Center, National Neurological Institute C.
Mondino, Pavia, Italy

Elena Cavallini
University of Pavia

John Dunlosky
Kent State University

Tomaso Vecchi
Brain Connectivity Center, National Neurological Institute C.
Mondino, Pavia, Italy and University of Pavia

Christopher Hertzog
Georgia Institute of Technology

Archives of Gerontology and Geriatrics

Contents lists available at ScienceDirect



Archives of Gerontology and Geriatrics

journal homepage: www.elsevier.com/locate/archger

Self-guided strategy-adaption training for older adults: Transfer effects to everyday tasks

Sara Bottiroli^{a,c}, Elena Cavallini^b, John Dunlosky^c, Tomaso Vecchi^{a,b}, Christopher Hertzog^d

^a C. Mondino National Neurological Institute, Pavia, Italy

^b University of Pavia, Pavia, Italy

^c Kent State University, Kent, USA

^d Georgia Institute of Technology, Atlanta, USA



RESEARCH ARTICLE

International Journal of
Geriatric Psychiatry

Self-help memory training for healthy older adults in a residential care center: specific and transfer effects on performance and beliefs

Elena Cavallini¹, Sara Bottiroli², Emanuela Capotosto¹, Rossana De Beni³, Giorgio Pavan⁴, Tomaso Vecchi^{1,2} and Erika Borella³

¹Department of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy

²Brain Connectivity Center, National Neurological Institute C. Mondino, Pavia, Italy

³Department of General Psychology, University of Padua, Padua, Italy

⁴ISRAA, Treviso, Italy

Research Article

Alessia Rosi*, Tomaso Vecchi, Elena Cavallini

Metacognitive-strategy training promotes decision-making ability in older adults**Table 4.** Mean and (standard error of the mean) of performance (expressed in percentage of correct responses) for practiced and non-practiced decision-making tasks as a function of group (decision-making training and active control training groups), and time (pre- and post-test).

	Decision-making training group		Active control training group	
	Pre-test	Post-test	Pre-test	Post-test
Practiced tasks				
EDMC task experiential-based problem	54.52 (1.98)	77.41 (1.57)	51.94 (2.24)	59.03 (2.25)
EDMC task analytical-based problem	74.77 (10.01)	79.80 (8.07)	75.97 (2.01)	68.61 (2.32)
EDMC task - daily	63.55 (1.72)	76.05 (1.72)	62.30 (2.18)	58.96 (2.34)
EDMC task - economic	60.94 (2.28)	80.56 (2.28)	59.17 (2.10)	66.87 (3.03)
EDMC task - health care	69.44 (2.38)	79.00 (2.16)	70.42 (2.66)	65.62 (2.64)
Non-practiced task				
ADR task	47.50 (3.44)	64.17 (3.32)	37.67 (3.98)	39.00 (3.34)

Note. EDMC = Everyday Decision Making Competence task; ADR = Applying Decision Rule Task

Table 1. Metacognitive-strategic questions.

1. Did I understand the decision problem I have to face?
(If not, I review or reevaluate the decision problem until I fully understand the situation)
2. What is the main information of the decision problem?
3. Do I have all the information necessary to make a decision?
(If not, what additional information do I need to make a decision?)
4. Who will be affected by my decision?
5. Who can help me with this decision?
6. What are the possible choices for this decision problem? *(describe each choice)*
For each choice, how will I feel 10 minutes after I make this choice?
7. Which strategies can I apply in order to decide?
8. What is the final decision?

1. Transfer to real life?

2. Can the cognitive training delay the decline?

3. Can the cognitive training alter functional connectivity?

Social engagement

Psychology and Aging, 2012, Vol. 27, No. 1, 3–16

© 2012 American Psychological Association
0892-7741/12/\$12.00 DOI: 10.1037/a0028170

The Dynamic Interplay of Social Network Characteristics, Subjective Well-Being, and Health: The Costs and Benefits of Socio-Emotional Selectivity

Oliver Huxhold
German Centre of Gerontology, Berlin, Germany

Katherine L. Fiori
Adephi University

Tim D. Windsor
Hinders University

This study investigated the interacting dynamics of different aspects of the social network, specifically network structure (size and frequency of contacts), social activity engagement, and emotional support, and different aspects of health and subjective well-being in a representative sample of 2034 older adults across 6 years of development. The analysis, using latent change score models, revealed that older age at Time 1 was related to steeper declines in network structure and social engagement, but was unrelated to changes in emotional support. Furthermore, levels of social engagement and levels of emotional support predicted changes in functional health and life satisfaction with equal strength. Changes in social engagement were associated with changes in life satisfaction, positive affect, functional health, and subjective health. Changes in emotional support were only associated with changes in negative affect. Mediation analyses suggested that network structure may stimulate social engagement and emotional support, thereby exerting indirect influences on key aspects of successful aging. The results underscore the importance of considering the multifaceted nature of social relations in understanding their impact on distinct developmental goals, and across different domains of successful aging.

Table 3
Correlations of All Indicators Used in the Analysis at T1

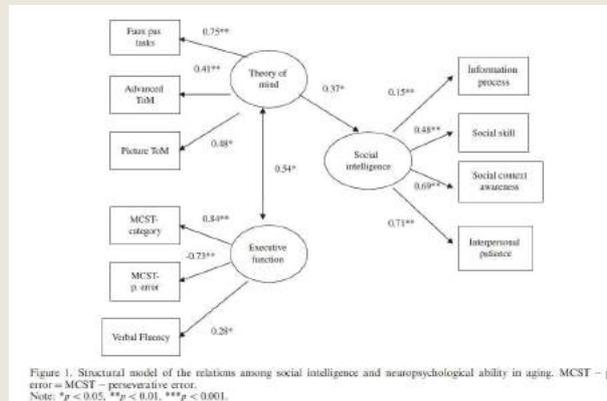
Variable	Age	Sex	Education	Network size	Contact frequency	Potential advice	Potential solace	Number of social activities	Time on social activities	Positive affect	Negative affect	Life satisfaction	Number of illnesses	Functional health
Sex	0.03													
Education	-0.05*	-0.34***												
Network size	-0.16***	-0.05*	0.06***											
Contact frequency	-0.10***	-0.02	0.03	0.82***										
Potential advice	-0.08***	0.05*	0.04	0.33***	0.26***									
Potential solace	-0.03	0.10***	0.04	0.33***	0.29***	0.55***								
Number of social activities	-0.28***	-0.12***	0.25***	0.27***	0.17***	0.18***	0.14***							
Time on social activities	-0.26***	-0.05*	0.19***	0.28***	0.19***	0.18***	0.16***	0.83***						
Positive affect	-0.16***	-0.03	0.21***	0.15***	0.07***	0.09***	0.07***	0.31***	0.28***					
Negative affect	-0.02	0.11***	-0.16***	0.02***	0.05*	-0.04	-0.03	-0.10***	-0.03	-0.20***				
Life satisfaction	-0.09***	-0.07**	0.12***	0.10***	0.14***	0.08**	0.12***	0.24***	0.51***	-0.33***				
Number of illnesses	0.14***	0.01	-0.03	-0.04	-0.01	-0.02	0	-0.12***	-0.12***	-0.13***	0.25***		-0.32***	
Functional health	-0.33***	-0.19***	0.18***	0.16***	0.09**	0.06*	0.01	0.45***	0.32***	0.32***	-0.17***	0.30***	-0.36***	
Subjective health	-0.17***	-0.03	0.09**	0.09**	0.09**	0.06*	0.03	0.25***	0.26***	0.36***	-0.18***	0.38***	-0.35***	0.60***

* $p < .05$. ** $p < .01$. *** $p < .001$.

Aging & Mental Health

Role of theory of mind and executive function in explaining social intelligence: A structural equation modeling approach

Zai-Ting Yeh



Theory of Mind and social relationships in older adults: the role of social motivation

Serena Lecce^a, Irene Ceccato^a, Federica Bianco^a, Alessia Rosi^a, Sara Bottiroli^b and Elena Cavallini^a

^aDepartment of Brain and Behavioral Sciences, University of Pavia, Pavia, Italy; ^bNational Neurological Institute C. Mondino, Pavia, Italy

Aging & Mental Health

Objectives: Previous research has shown that individual differences in Theory of Mind (ToM) are crucial for people's social relationships. However, very few studies have investigated this issue in ageing. The present study was designed to fill this gap and examine the associations between ToM and social relationships in elderly adults. In doing so, this study considered people's relationships with their relatives and friends, and examined the possible moderating role of social motivation.

Method: The study involved 53 healthy older adults (age: $M = 67.91$; $SD = 6.93$; range: 60–85 years). All participants were tested collectively during a 2-hr session and completed a demographic questionnaire as well as a battery of tests assessing verbal ability (vocabulary and word fluency), ToM and social relationships. They also answered a social motivation question.

Results: Results showed that individual differences in older people's ToM were overall significantly associated with those in relationships with friends, but not relatives. In addition, the Hayes moderating procedure showed that individual differences in ToM were related to those in friendships only for those people who had a high or medium level of social motivation.

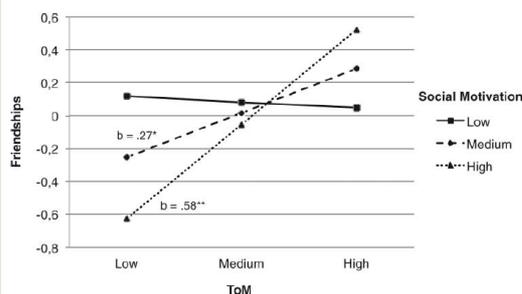
Conclusion: These findings underline the importance of motivation in guiding the use of ToM in everyday social interactions.

ARTICLE HISTORY

Received 26 June 2015
Accepted 27 October 2015

KEYWORDS

Theory of Mind; social relationships; ageing; social motivation



21

AGING, NEUROPSYCHOLOGY, AND COGNITION
<https://doi.org/10.1080/1382585.2018.1500996>

Routledge
Taylor & Francis Group

Check for updates

Investigating ToM in aging with the MASC: from accuracy to error type

Serena Lecce, Irene Ceccato and Elena Cavallini

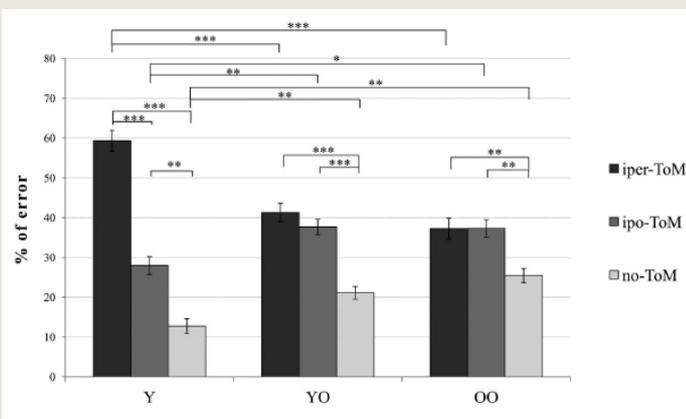


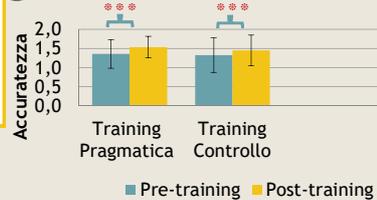
TABLE 3 | Means value and standard deviations for ToM task performance as a function of Group condition (ToM and physical-conversation groups) and Time (pre- and post-test).

	ToM training		Physical-conversation training	
	Pre	Post	Pre	Post
Strange stories	59.42 (14.89)	79.62 (12.70)	63.60 (13.11)	75.56 (17.03)
Physical stories	65.62 (16.48)	68.05 (19.24)	65.96 (13.94)	67.79 (20.36)
ToM animation				
Intentionality	56.49 (10.66)	64.00 (12.17)	50.38 (17.88)	54.00 (14.36)
Action descriptions	0.24 (0.49)	0.17 (0.57)	0.73 (1.19)	0.36 (0.86)
Interaction descriptions	2.67 (0.91)	2.28 (1.07)	2.46 (1.03)	2.68 (0.90)
Mentalizing descriptions	1.08 (1.01)	1.54 (1.07)	0.77 (0.76)	0.96 (0.67)
Goal-directed animation				
Intentionality	43.51 (10.46)	45.75 (10.38)	42.31 (14.85)	44.20 (12.72)

Training to enhance pragmatics

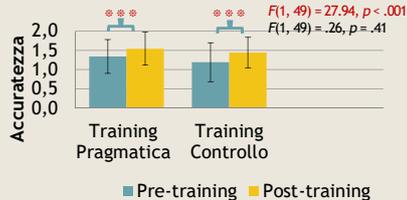
Difficulties in pragmatics decrease the engagement in social relationships (Cummings 2017; Bambini et al. 2016)

Metafore



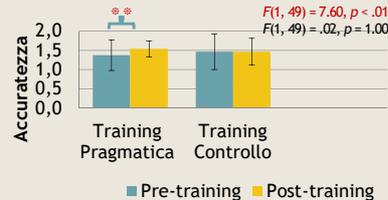
$F(1, 49) = 19.15, p < .001$
 $F(1, 49) = .69, p = .41$

Metafore Mentali



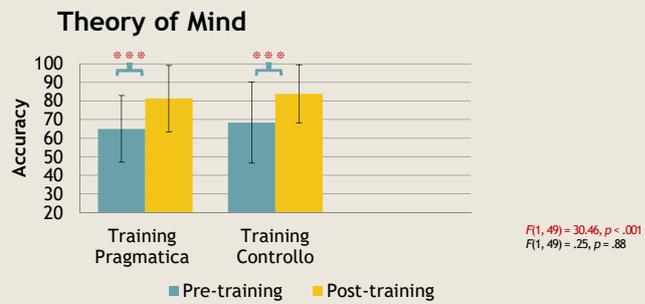
$F(1, 49) = 27.94, p < .001$
 $F(1, 49) = .26, p = .41$

Metafore Fisiche



$F(1, 49) = 7.60, p < .01$
 $F(1, 49) = .02, p = 1.00$

Transfer effect



1. Transfer of training benefits to social engagements

Cognitive, Affective, & Behavioral Neuroscience | DOI:10.1162/089976510a00024
<https://doi.org/10.1162/089976510a00024>

Enhancing theory of mind in behavioural variant frontotemporal dementia with transcranial direct current stimulation

Maria Cotelli¹ · Mauro Adenzato^{2,3} · Valentina Cantoni^{4,5} · Rosa Marenti¹ · Antonella Alberici⁶ · Ivan Enrici^{1,8} · Alberto Benussi⁷ · Valentina DeFerra⁹ · Elisa Bonetta⁸ · Alessandro Padovani⁸ · Barbara Borroni⁸

2. CAN WE INCREASE TRAINING EFFECTS BY COMBINING OUR TRAINING WITH BRAIN STIMULATION?

3. CAN WE USE TOM TASKS TO DETECT NEUROGENERATIVE DISEASES?

Neuroscience and Biobehavioral Reviews | Volume 34 | Issue 4 | 2010

Contents lists available at ScienceDirect

Neuroscience and Biobehavioral Reviews

Journal homepage: www.elsevier.com/locate/neubiorev

Review

Cognitive and affective Theory of Mind in neurodegenerative diseases: Neuropsychological, neuroanatomical and neurochemical levels

Michele Poletti¹, Ivan Enrici^{1,2}, Mauro Adenzato^{3,4,5}

¹Department of Psychological Sciences, University of Padua, Italy
²Center for Cognitive and Behavioral Studies, University of York, York, UK
³Center for Cognitive and Behavioral Studies, University of York, York, UK
⁴Department of Psychology, University of York, York, UK
⁵Neuroscience Institute of York, York, UK





Sara Bottiroli
Irene Ceccato
Alessia Rosi

Serena Lecce

Valentina Bambini