Modeling subjective memory beliefs and cognitive function in older adults: What's memory got to do with it?

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Rationale

• The relationship between memory beliefs and memory performance has been a major topic of investigation in cognitive aging literature for the past three decades (Berry, 1999; Hertzog, et al., 1990; Stine-Morrow, et al., 2006; Rebok & Balcerak, 1989; West & Yassuda, 2004).

• Little attention has been given to understanding the extent to which general cognitive function might account for the relationship between episodic memory performance and memory beliefs. This is important, given that age-related declines occur in a whole constellation of abilities, including changes in executive reasoning and psychomotor speed (Park et al., 1996), and these declines are often correlated (McArdle et al., 2002).

Do older adults' negative self-perceptions of memory accurately reflect memory ability, or declines in cognitive function more generally?

• We investigated the unique and general relationships between cognitive function and subjective memory beliefs, testing the hypothesis that self-reports of memory beliefs reflect cognitive ability more generally, rather than memory alone.

Method and Analytical Approach

• We analyzed pretest data from two different cognitive intervention studies (Senior Odyssey and Advanced Cognitive Training in Independent and Vital Elderly (ACTIVE)), using a **two-stage** modeling approach to test whether the relationship between memory performance and memory beliefs could be accounted for by a broader domain-general cognitive functioning factor (made up of psychomotor speed, executive reasoning, and episodic memory).

(1) we fit a structural equation model with **correlated latent factors** for memory, reasoning, and episodic memory as predictors of memory self-efficacy (MSE), to examine the unique influence of each cognitive function on memory beliefs (see Figure 1).

(2) We then fit a **bifactor** model (Holzinger & Swineford, 1937; Reise, 2012) to the cognitive performance data. Each cognitive test item loaded on a general cognitive factor. At the same time, individual domain-specific bifactors were included for reasoning, speed, and episodic memory, which represent unique variance in each domain. These factors were regressed onto MSE in order to test whether any bifactor maintains a unique relationship with memory beliefs after accounting for the domain-general influence of cognition on memory beliefs.

Study 1: Senior Odyssey (N = 462)

Variable	Mean or N	Standard Deviation or %	Observed Range
Age	72	7.71	60-94
Education	15.5	2.63	9-20
MMSE	28.41	1.40	24-30
Female	341	74%	--

Measures

Memory (Mem): HVLT total immediate and delayed recall; Sentence Recall
Reasoning (IR): Letter Sets; Letter Series; Word Series; Number Series; Everyday Problem Solving
Speed: Letter Comparison; Pattern Comparison Finding A's; Identical Pictures
MSE (subjective memory): MIA Capacity (Cap) and Change (Chn)

Results

Model 1 (Figure 1A): **Correlated Latent Factor**
• Good fit to data.
• Latent memory, reasoning, and speed factors intercorrelated (see Table 1).
• Unique prediction of MSE from latent memory (β = .12, SE = .06, t = 2.11, p = .03) and latent reasoning (β = .12, SE = .05, t = 2.34, p = .02).
Model 2 (Figure 1B): General Cognition Bifactor
• Good fit to data.
• Domain general Cognition factor explains about 4% variance in MSE (β =.19, SE = .06, t = 3.08, p < .01).
• Unique latent memory factor explains <1% variance in MSE. (β =.07, t = 1.24, p = .21).

Study 2: ACTIVE (N = 2,802)

Variable	Mean or N	Standard Deviation or %	Observed Range
Age	74	5.91	65-94
Education	13.53	2.70	4-20
MMSE	27.31	2.01	23-30
Female	2126	76%	--

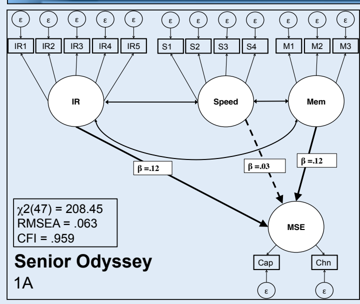
Measures

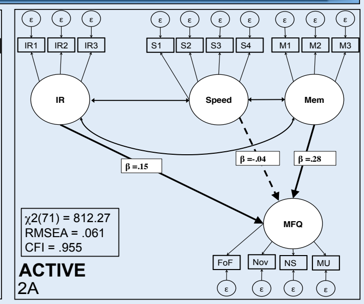
Memory (Mem): HVLT Total; Rey AVLT; Rivermead
Reasoning (IR): Letter Sets; Letter Series; Word Series
Speed: UFOV, Digit Symbol Copy and Substitution
MSE (subjective memory): Memory Functioning Questionnaire: FOF, Nov, NS, MU

Results

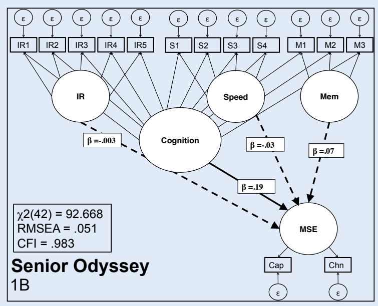
Model 1 (Figure 2A): **Correlated Latent Factor**
• Good fit to data.
• Latent memory, reasoning, and speed factors intercorrelated (see Table 1).
• Unique prediction of MSE from latent memory (β = .28, SE = .03, t = 8.65, p < .001) and latent reasoning (β = .15, SE = .03, t = 4.78, p < .001).

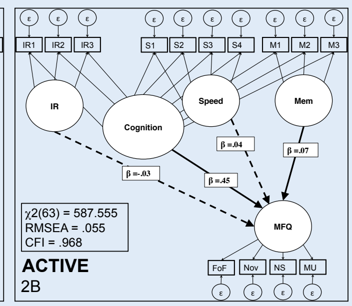
Correlated Latent Factors Models





General Cognition Bifactor Models





Latent Factor Correlations (Top = ACTIVE; Bottom = Odyssey)

Table 1	Speed	Memory	Reasoning
Speed	--	.58	.62
Memory	.53	--	.64
Reasoning	.57	.78	--

Results cont'd

Model 2 (Figure 2B): General Cognition Bifactor
• Good fit to data.
• Domain general Cognition factor explains about **20%** variance in MSE (β =.45, SE = .03, t = 13.43, p < .001).
• Unique latent memory factor explains <1% variance in MSE. (β =.06, SE = .03, t = 2.12, p = .03).

Conclusions

•The inclusion of a general cognition factor reduced the relationship between memory performance and memory beliefs.
•The general cognition factor explained the greatest amount of variance in memory beliefs.
•These findings are consistent with the account that measures of dispositional memory beliefs reflect self-reports about cognition more generally, and may be one reason why memory beliefs have broader predictive validity for interventions that target fluid ability (Payne et al., 2012a,b).

References

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