



Who Dares, Who Errs? Disentangling Cognitive and Motivational Roots of Age Differences in Decisions Under Risk

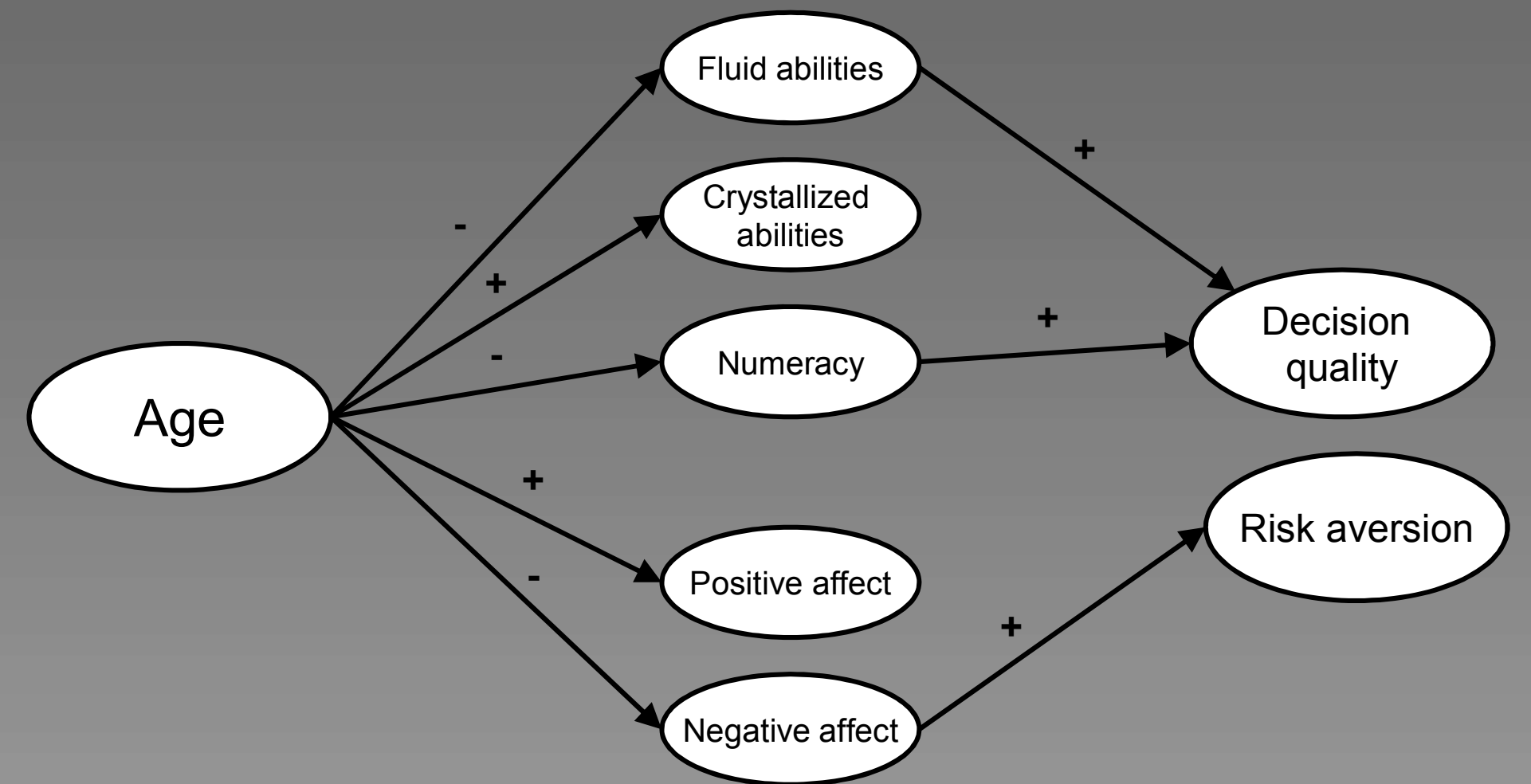
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Goals

- We compared younger and older adults on two aspects of decision making under risk: decision quality and risk aversion
- Many previous studies (e.g., Rutledge et al., 2016; Mather et al., 2012) have used decision problems in which people chose between a risky and a safe option; this might confound riskiness and complexity of the options
- We used decision problem in which people chose between two risky options
- We also examined the cognitive and motivational factors that drive age differences in decision quality and risk attitude, respectively
- We modeled older and younger adults' risky choices with cumulative prospect theory (CPT; Tversky & Kahneman, 1992). CPT allows to measure individual differences in outcome sensitivity (α), loss aversion (λ), probability sensitivity (γ), optimism/pessimism (δ), and response noise (θ)



Method

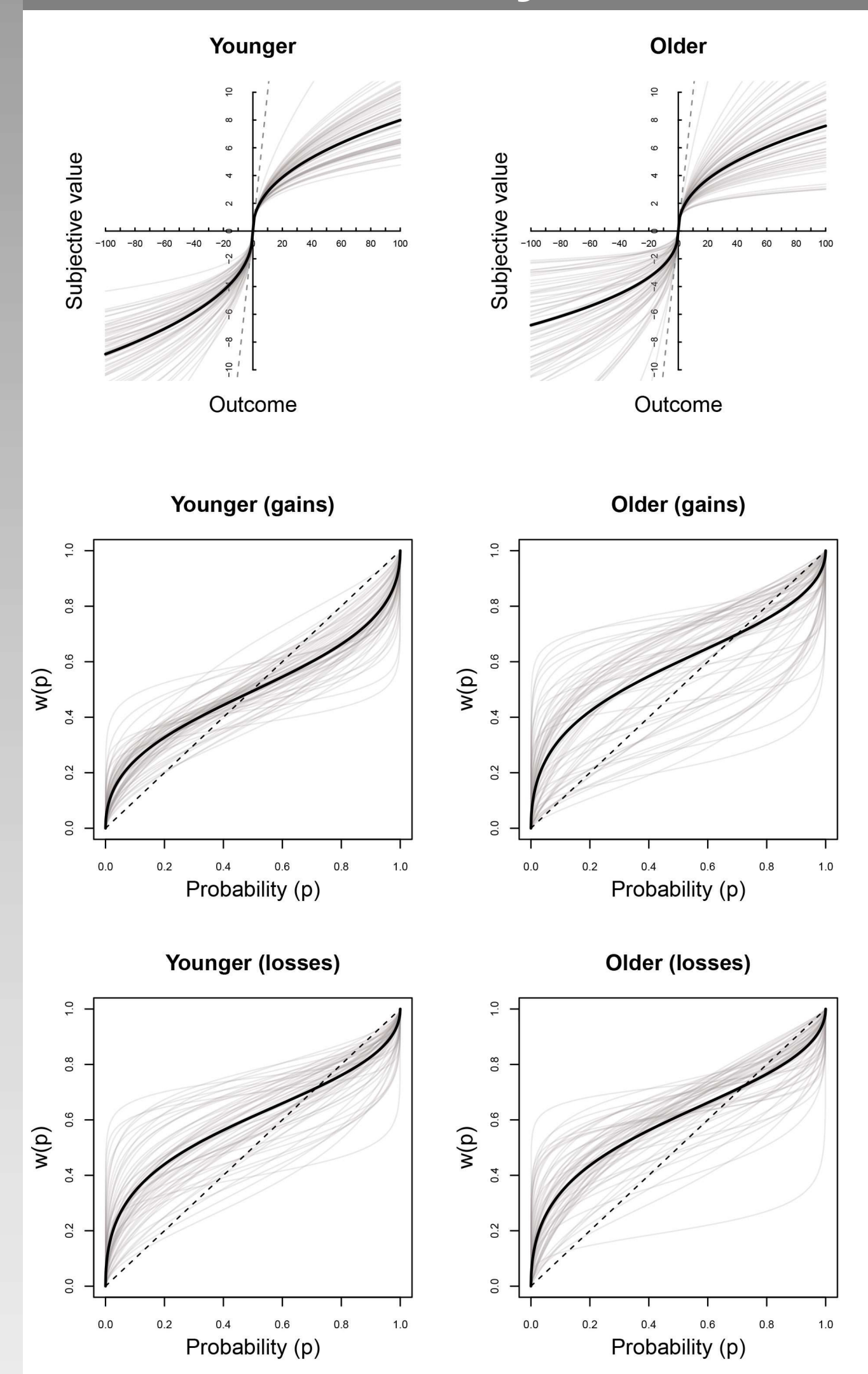
Participants

- 60 younger adults (YA; mean age = 23.6, 46 females)
- 62 older adults (OA; mean age = 71.2 years, 31 females)

Material

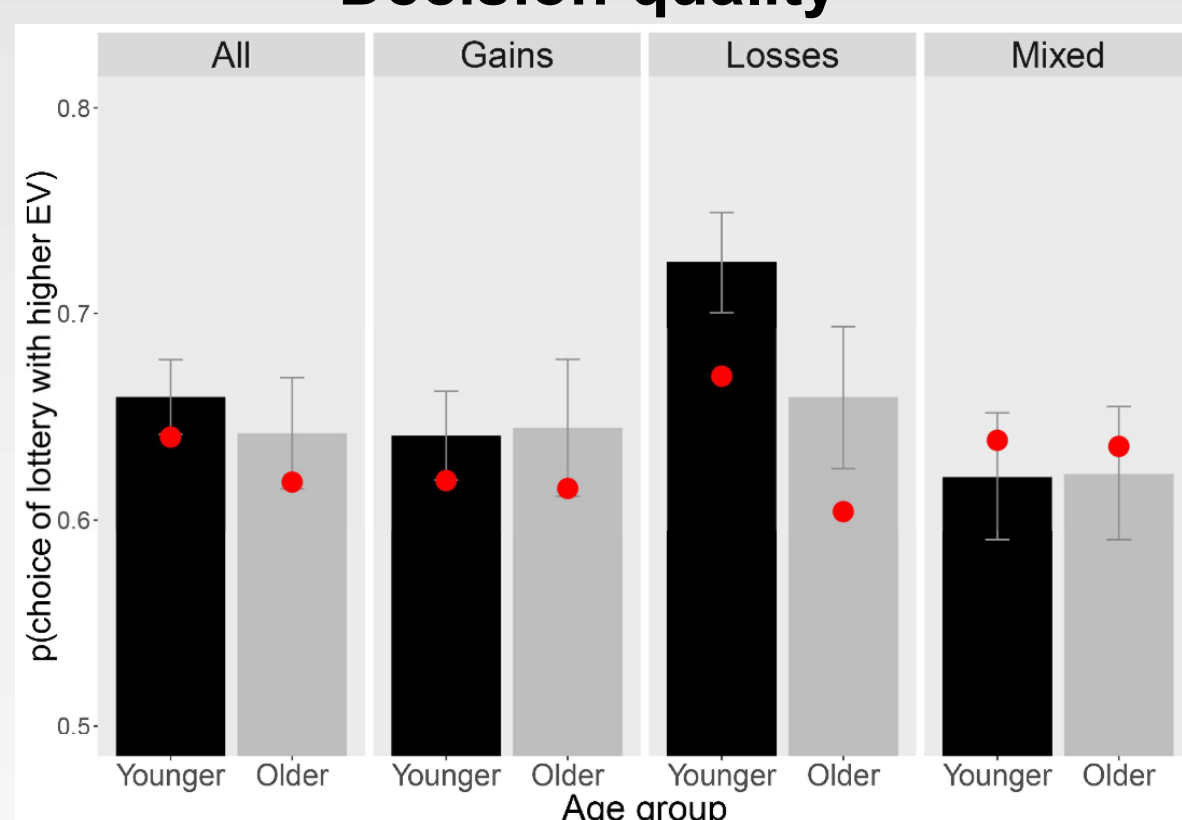
- Risky choice task (104 monetary lottery problems with two-outcome options; gain, loss, and mixed domain), incentivized
- Digit-symbol-substitution task (fluid abilities)
- Spot-a-word task (crystallized abilities)
- Numeracy task
- PANAS-X (positive affect, negative affect)

CPT analysis



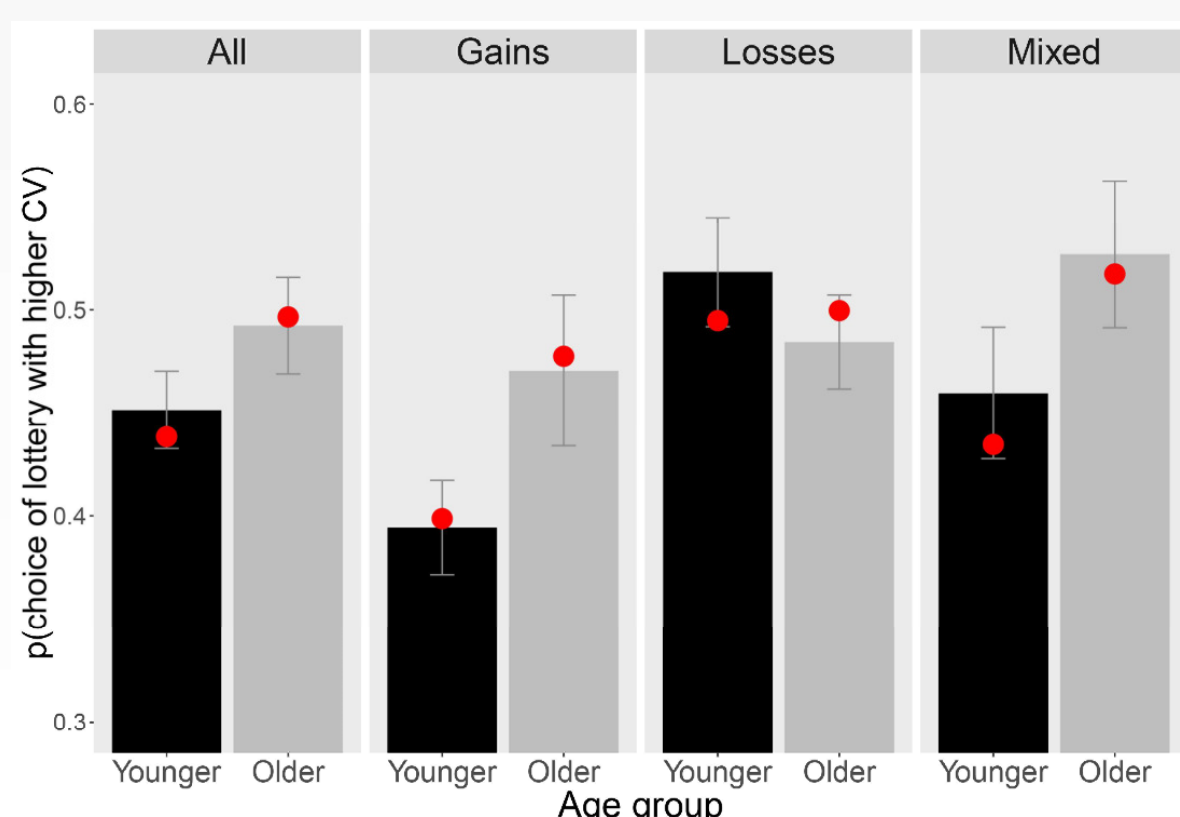
Age differences in risky choice

Decision quality



→ lower decision quality in older adults

Risk aversion



→ lower risk aversion in older adults

CPT Parameter

		α	λ	γ	δ^+	δ^-	θ
YA	M	0.45	1.11	0.50	0.98	1.58	1.50
	HDI	[0.41,0.49]	[1.00,1.22]	[0.45,0.57]	[0.86,1.10]	[1.27,1.94]	[1.19,1.86]
OA	M	0.44	0.89	0.52	1.49	1.58	0.89
	HDI	[0.39,0.49]	[0.75,1.05]	[0.42,0.63]	[1.16,1.89]	[1.19,2.13]	[0.67,1.13]
Δ_{OA-YA}	M	-0.01	-0.22	0.02	0.52	0.01	-0.62
	HDI	[-0.08,0.05]	[-0.40,-0.03]	[-0.10,0.14]	[0.16,0.93]	[-0.54,0.63]	[-1.04,-0.23]

Summary

Older adults showed poorer decision quality than younger adults; this age difference was attributable to decline in older adults' cognitive abilities. Moreover, older adults chose the more risky option more often than younger adults; this was attributable to older adults' less pronounced negative affect. Hierarchical Bayesian modeling with cumulative prospect theory revealed that older adults had more optimistic decision weights for gains and higher response noise than younger adults. Moreover, in contrast to younger adults, older adults showed no loss aversion.