

Decisions Across the Lifespan:

How Cognition Affects Performance,
and How to Help.

Eric J. Johnson

Columbia University

October 11, 2007

Decisions Do Not get Simpler or Less Important with Age.

- Examples:
 - Move or remain in one's current living arrangements, etc.
 - Selecting between medical regimens
 - Financial decisions about converting retirement savings to annuities,
 - Medicare Part (D)
- Many of these are unique, Little chance to learn from experience.

What do we know?

- Surprisingly Little:
 - Older decision-makers rely/manage emotions better.
 - Compensate by having others help them make decisions.
 - Abundant evidence that some cognitive deficits occur.
 - Recent evidence that this may affect decision-making performance.
- Our goal: Relate what we know about cognitive aging to what we know about decision-making
 - Since memory and executive function are well known components of cognitive aging, we use decision-making theories that rely on these components: Query Theory.
 - Goal is to explain, understand and *intervene* to improve performance.

Case Study: Loss Aversion

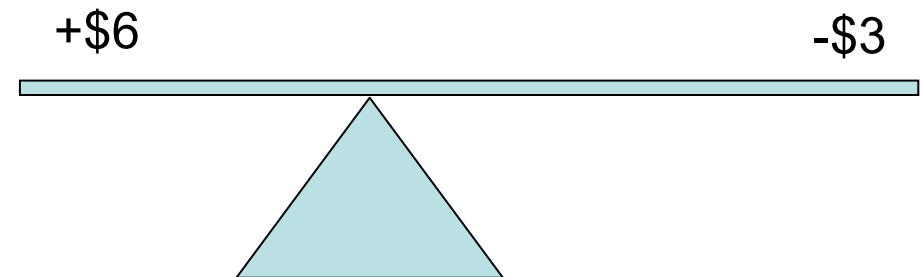
- Loss Aversion: Losses loom larger than the equivalent gain.
- Prototypical Decisions:
 - Should I stay in my house or move?
 - How about a choice between medical treatments?
 - Treatment A: 80% survival rate
 - Treatment B: 20% mortality rate
 - Should I trade my retirement savings for an annuity?
- Leading cause for default effects.

Measuring Loss Aversion

- Would you play a gamble with a \$6 win if a coin comes up heads and if it comes up tails a:



	λ
– \$2 loss	3
– \$3 loss	2
– \$4 loss	1.5
– \$5 loss	1.2
– \$6 loss	1
– \$7 loss	.88



$$\lambda = 6/3 \text{ or } 2$$

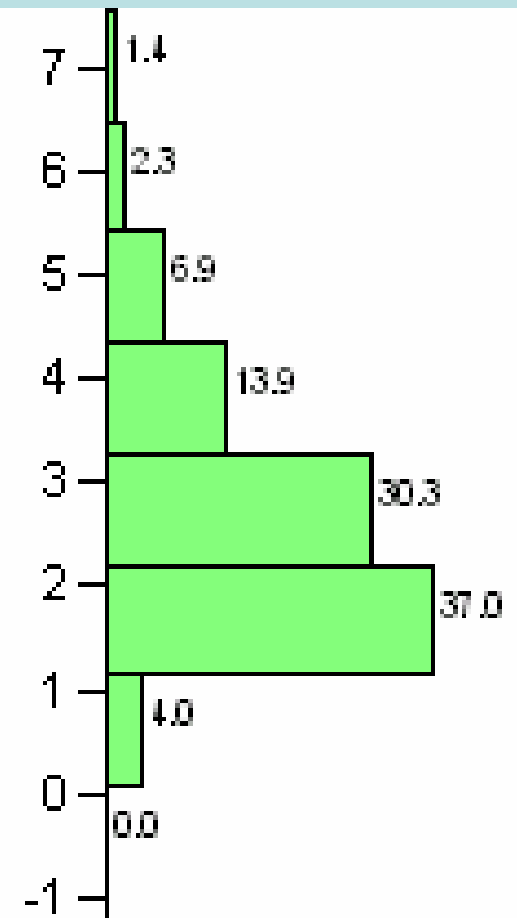
- Which would you play?

Buying and Selling Model Cars...

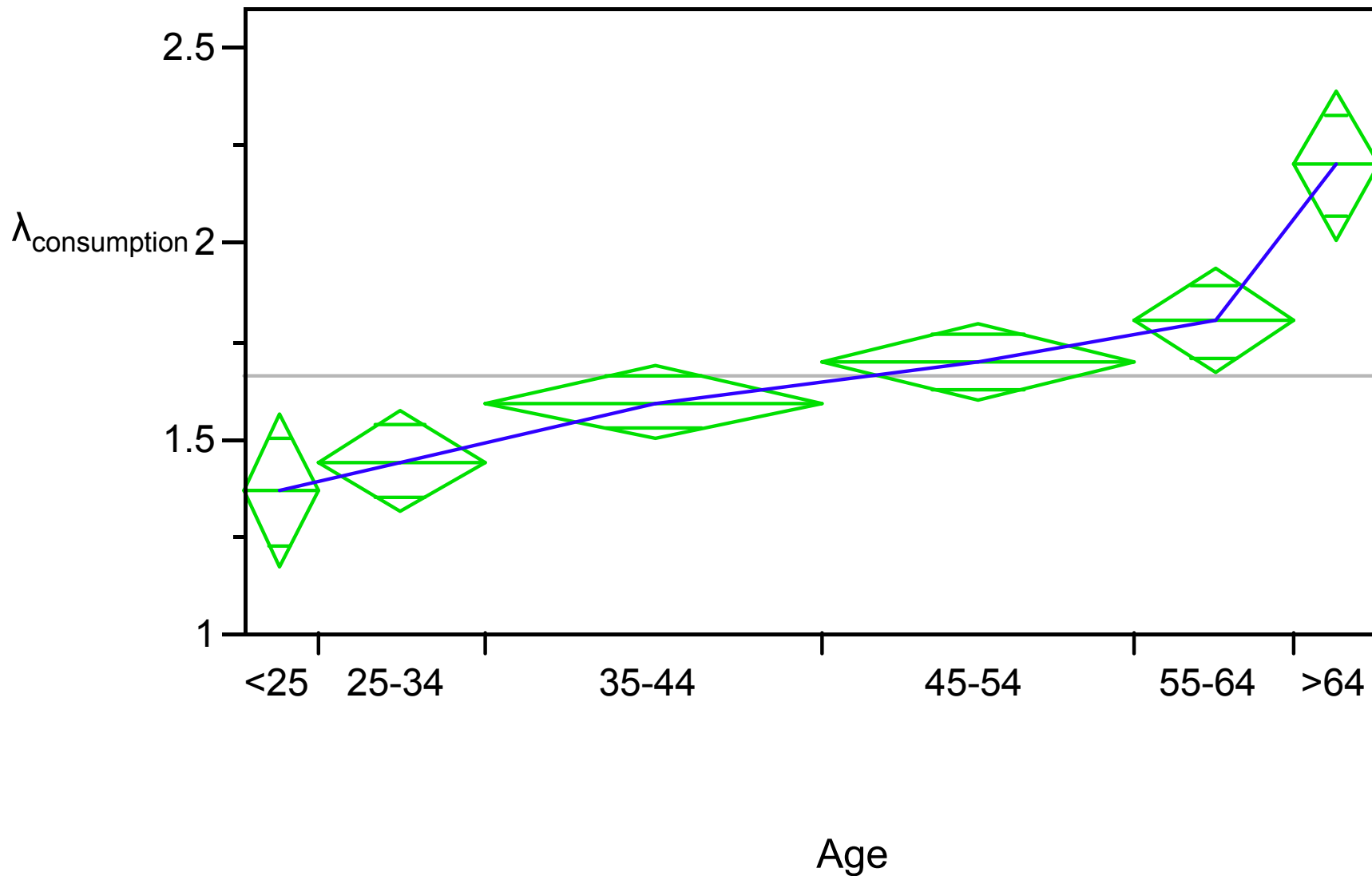
- Strategy Method
 - How much would you pay for this model car
 - *[Several pages later]*
 - How much would you demand for this car
 - All actual transactions.



Median 2, Mean=2.68



Age Increases Loss Aversion



Why: Changes in Brain Density.

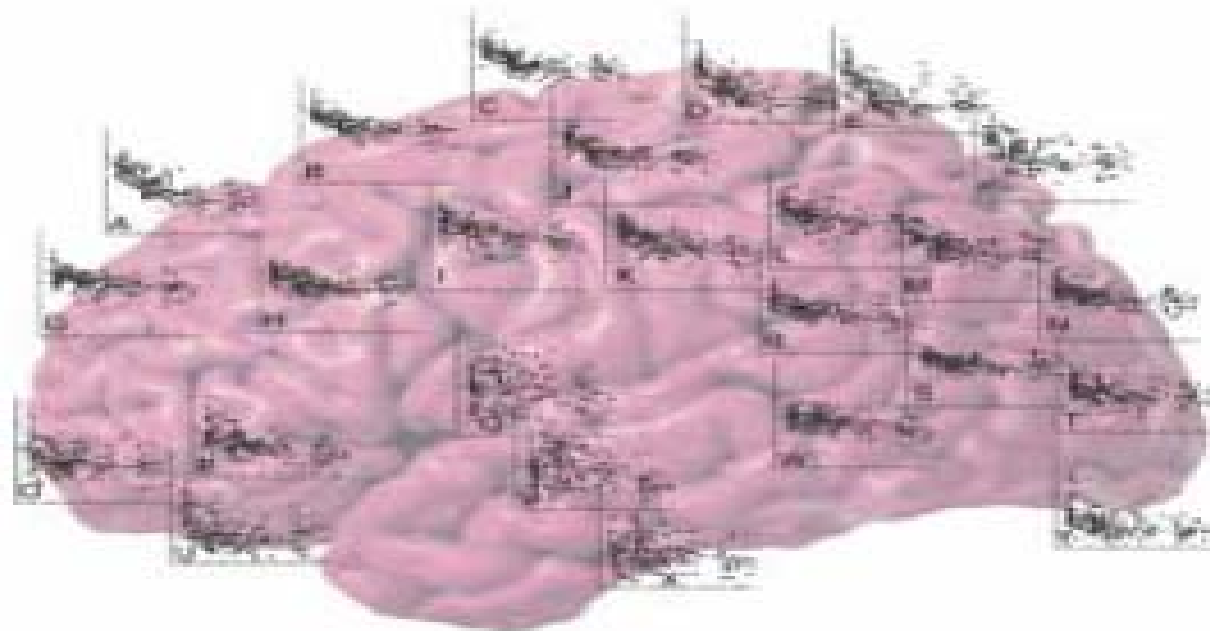
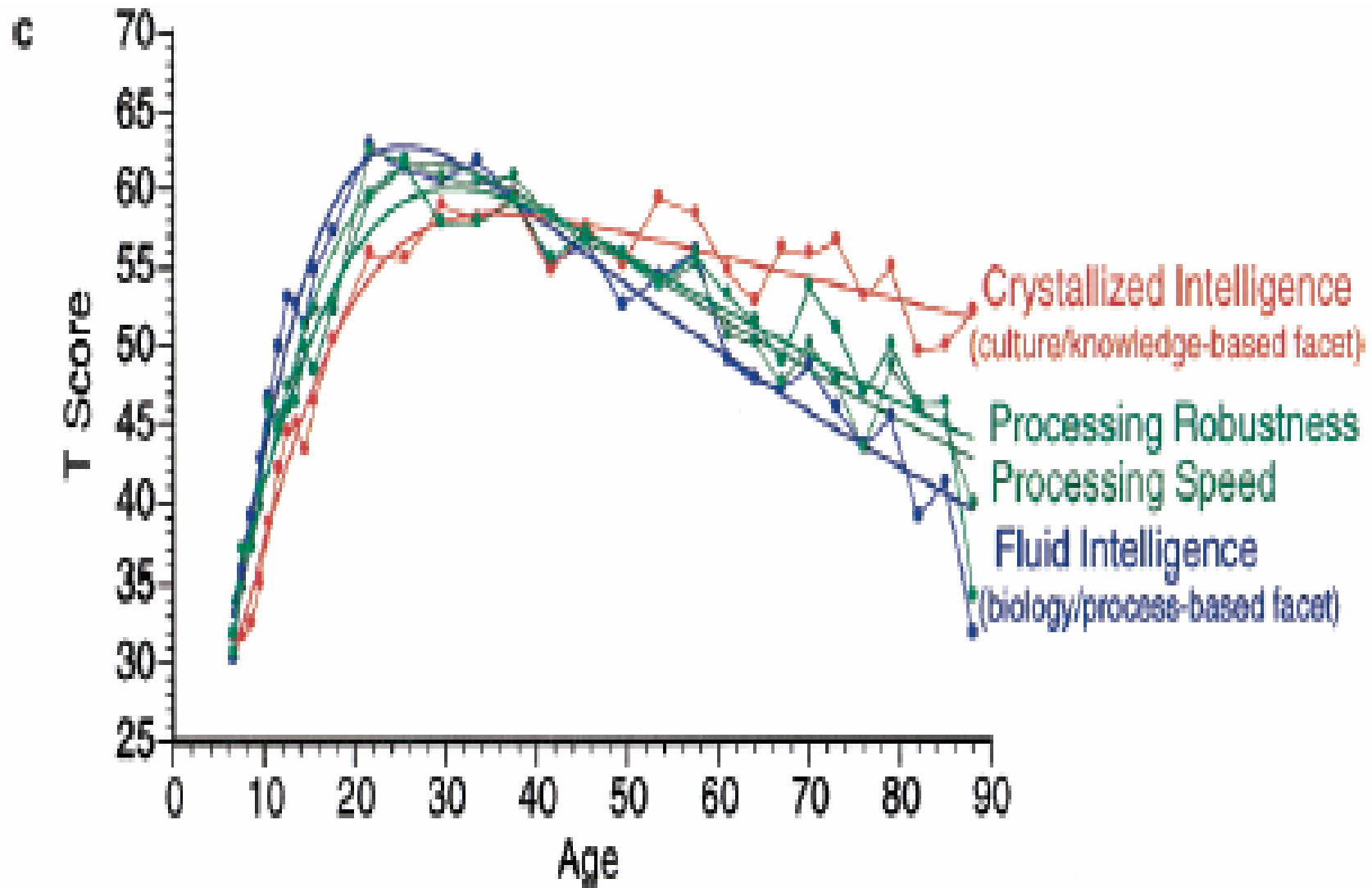


Fig. 14. Shown is a surface rendering of a human brain (left hemisphere; left is anterior, right is posterior) with scatter plots for gray matter density at various points over the brain surface. The graphs are laid over the brain approximately where the measurements were taken. The axes for every graph are identical, and they are identical to the axes on graphs shown in Figure 13 (Sowell and others 2003).

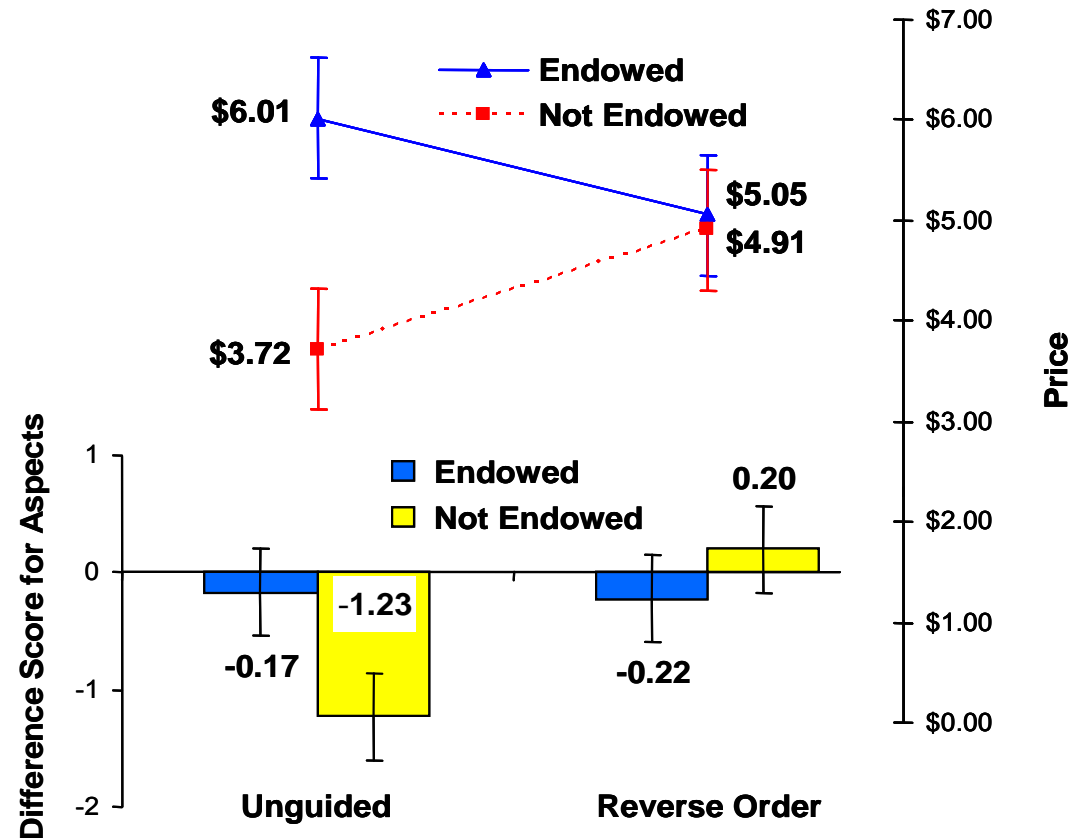
Fluid Intelligence declines



Intervention Can we Reduce Loss Aversion?

- Expertise does diminish loss aversion.
- Changing the Focus:
 - Makes the effect of loss aversion disappear.
 - Changes the kinds of aspects that are considered.

Figure Aspects and Prices, Experiment 3, Johnson, Häubl and Keinan



Next Steps

- While consistent with the idea that
 - Changes in certain cognitive abilities can affect decision-making
 - Expertise can mitigate these effects
- These *suggestive* results require further research
- Similar stories apply to Choices Across Time.
 - Evidence that some effects increase with age.
 - Currently gathering imaging data to test out account
- Outcomes:
 - The design of better choice architecture for decision-makers of all ages:
 - The best defaults.
 - The best number of alternatives.
 - The best displays of information
 - The best strategies for making wise choices.
 - The Development of techniques, based on process models which will improve decision-making