

Aging and Episodic Feelings-of-Knowing (FOKs)

Cognitive Aging Brown Bag – 10/12/16

Taylor Curley

Overview of presentation

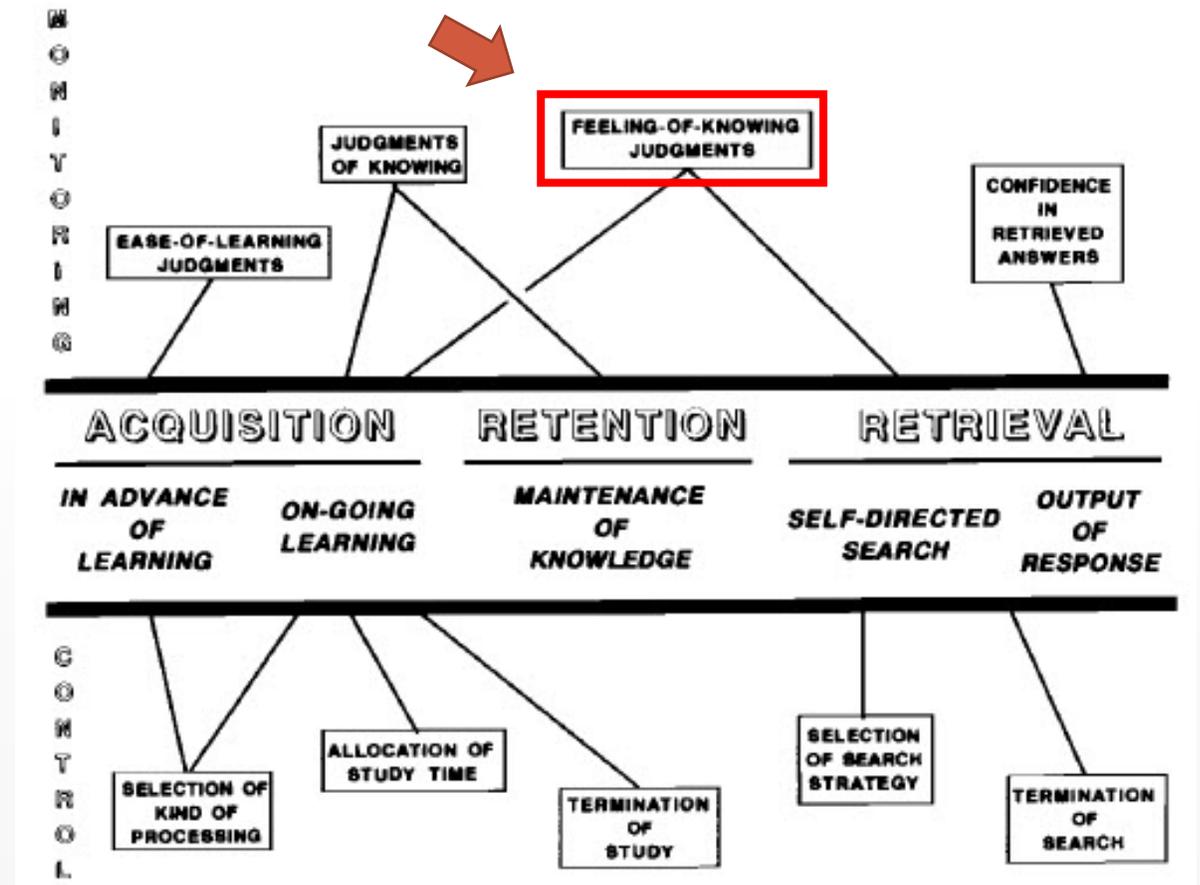
- Quick review of feelings-of-knowing (FOKs)
- Describe points of contention in the current metacognitive aging literature
 - Some studies say that FOK accuracy declines with age while others don't
 - Differences in experimental protocols could account for this discrepancy
- Introduce the current experiment
 - Designed to clarify controversy in literature regarding age differences in FOK accuracy

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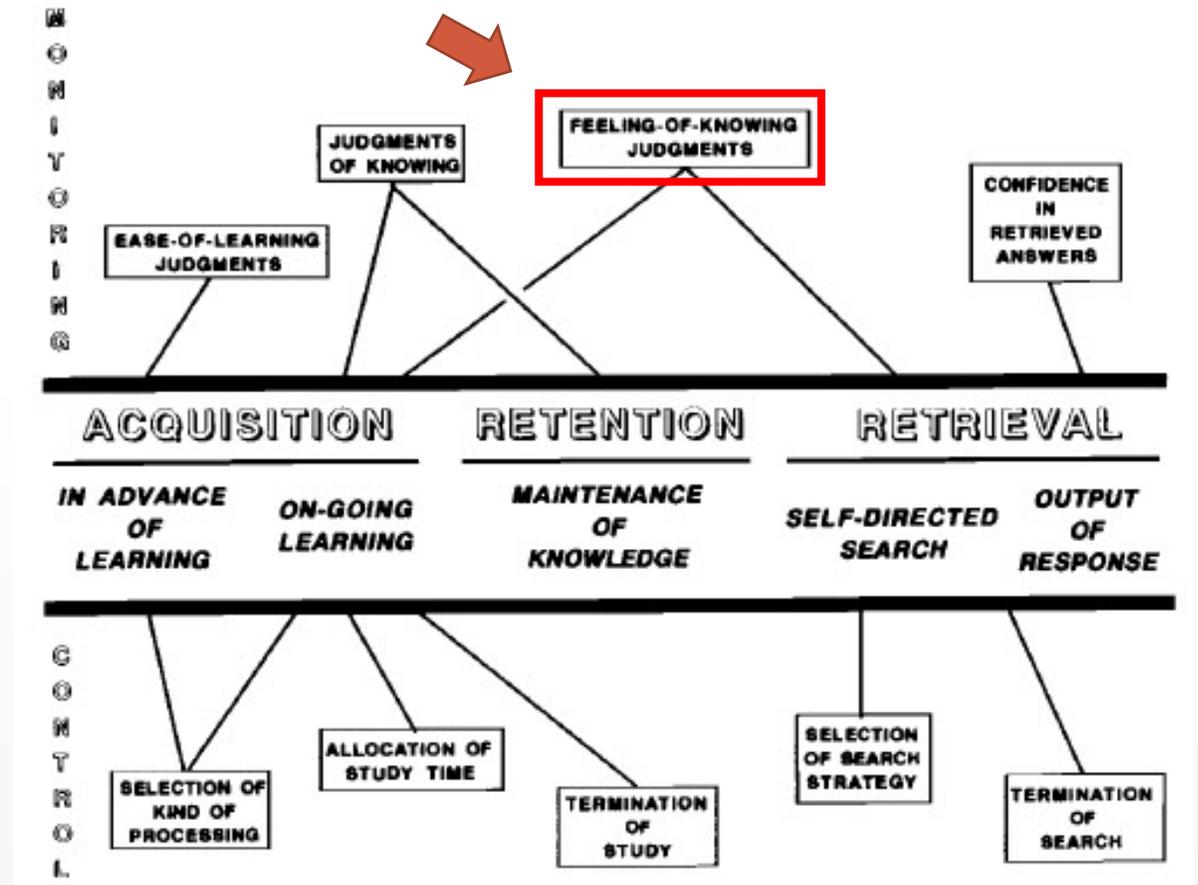
Feeling of Knowing (FOK)

- Predictions of later recognition for items that cannot be recalled
- Incorporates aspects of both memory *acquisition* and *retrieval*



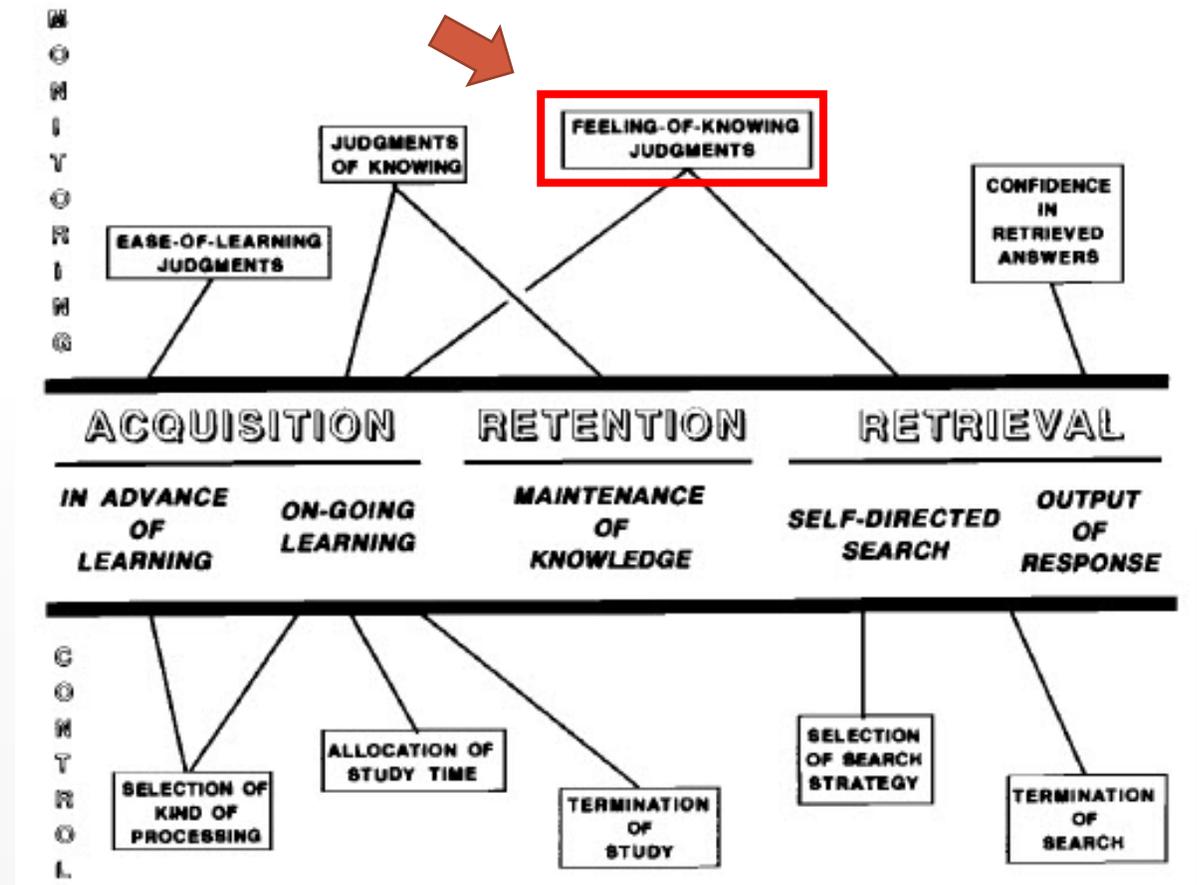
Feeling of Knowing (FOK)

- How do you study the accuracy of FOKs?
- Recall-judgment-recognition (RJR) paradigm
 - Hart, 1965
 - Study words, test for recall, make FOKs for unrecalled items, and then test for recognition



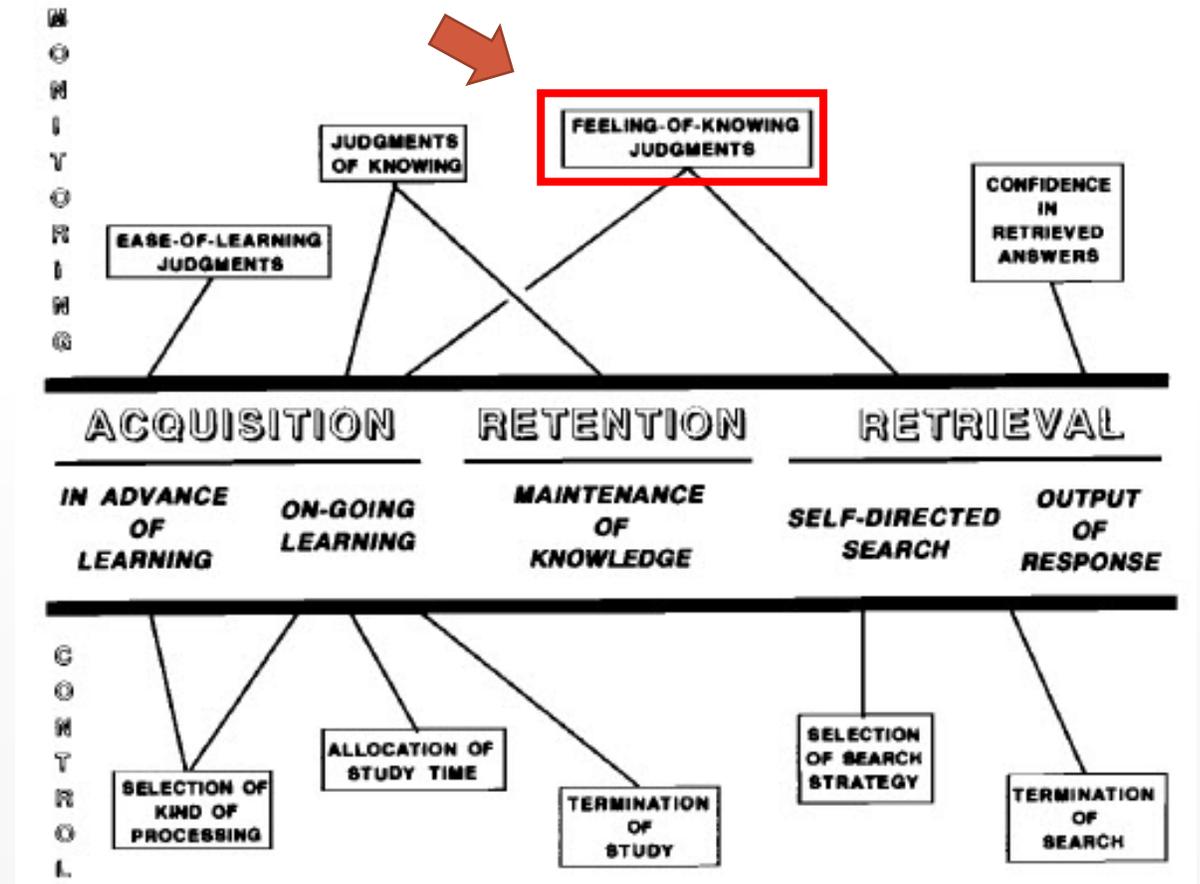
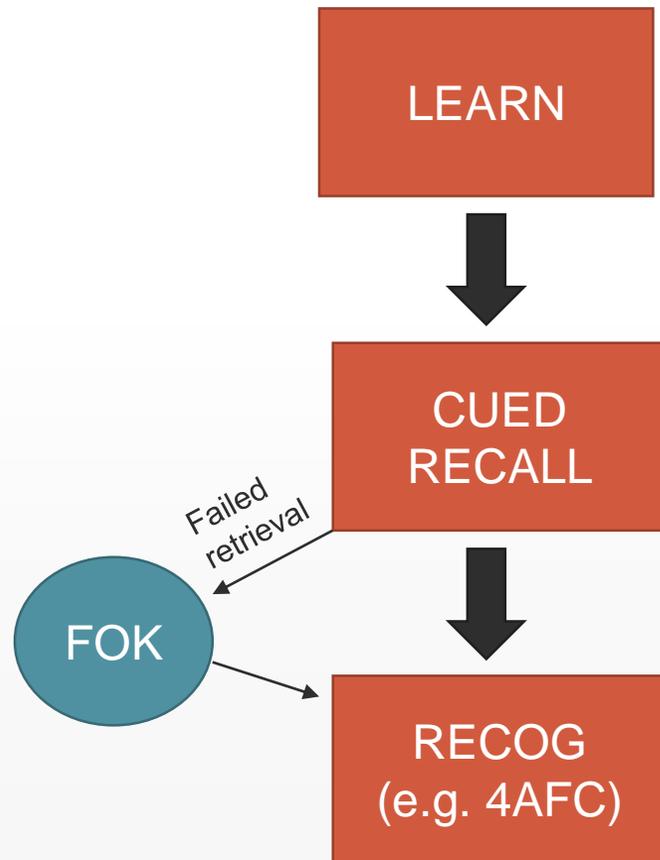
Feeling of Knowing (FOK)

- DURING STUDY
 1. “Toy – Truck”
- DURING CUED RECALL
 1. “Toy – ?”
 2. “How well do you think that you would be able to recognize the associate word if it was presented with similar words?” (0 – 100)
- DURING RECOGNITION
 1. “Toy – ?”
Ball, Blocks, Truck, Action Figure
 2. “Please choose the word that you believe is associated with the word presented above”



Feeling of Knowing (FOK)

- In other words...



Feeling of Knowing (FOK)

How is the accuracy of FOKs measured?

1. Magnitude (i.e. % recognition vs. average FOK)
 - Scaling issues can make FOK magnitude an undesirable measure
2. Resolution (i.e. level of agreement between FOK and recognition)
 - Measures of ordinal association between 2 quantities (range [-1, 1])
 - Goodman-Kruskal gamma correlation
 - Kendall's tau coefficient

The higher resolution, the stronger the relationship between the memory judgments and the actual memory performance.

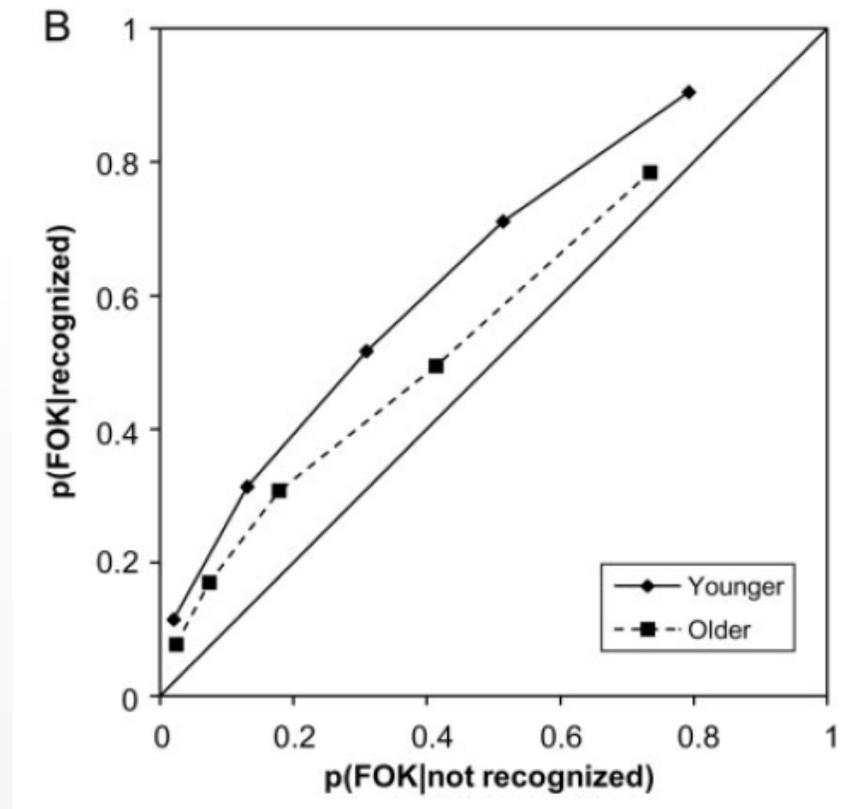
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Aging and FOKs

Conflicting reports on accuracy of FOKs and aging

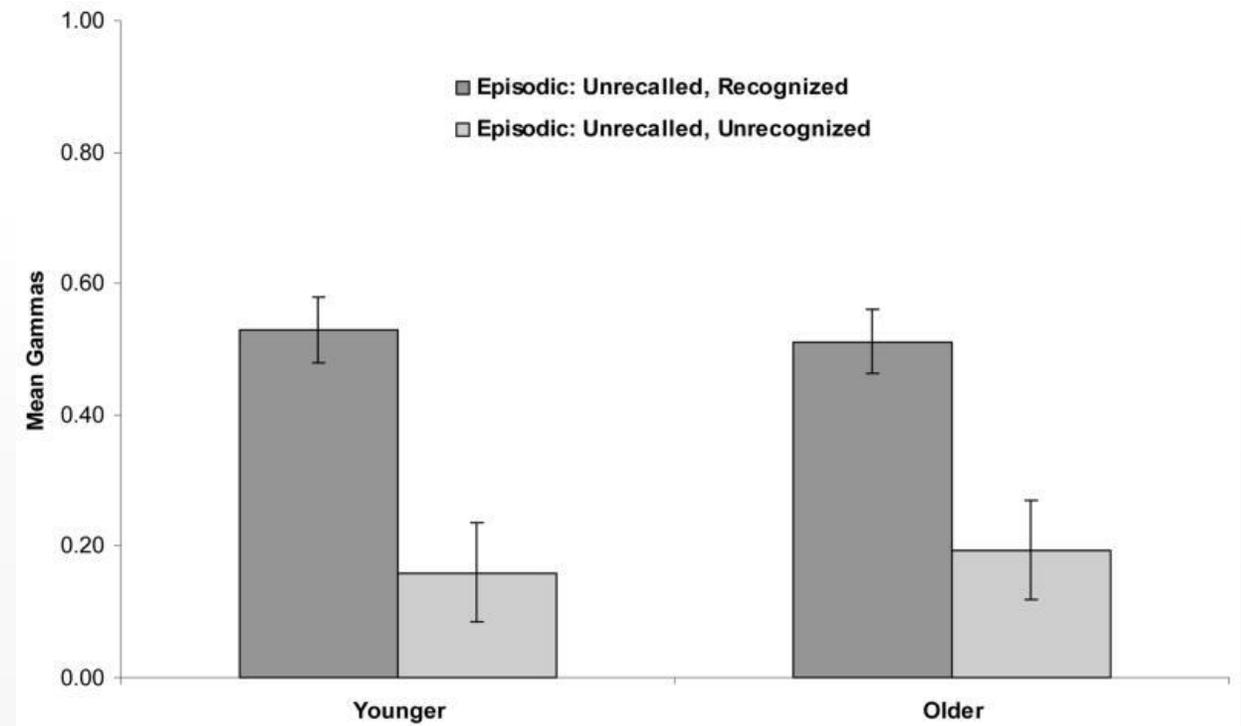
- Some studies show age-related deficits in FOK accuracy favoring young adults
 - Thomas et al., 2011; Souchay et al., 2007; Sacher et al., 2013, 2014



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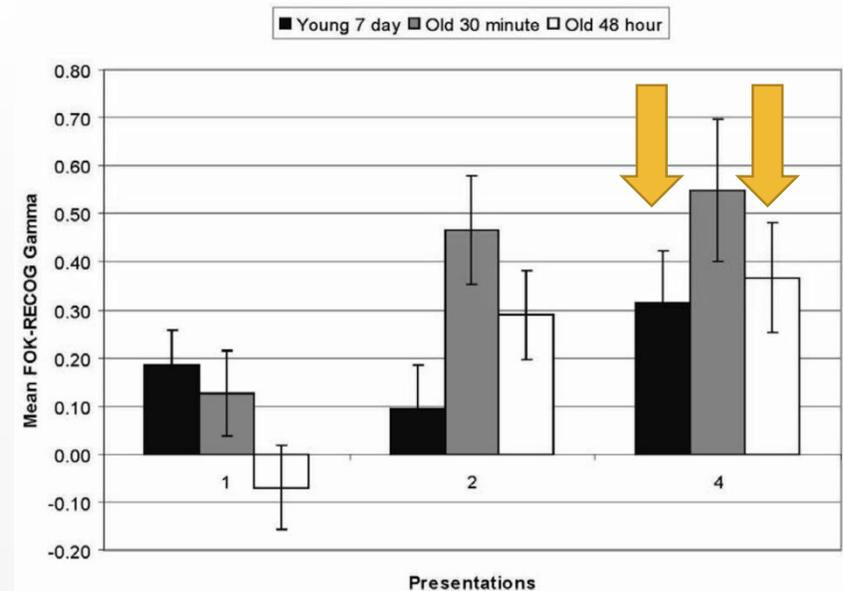
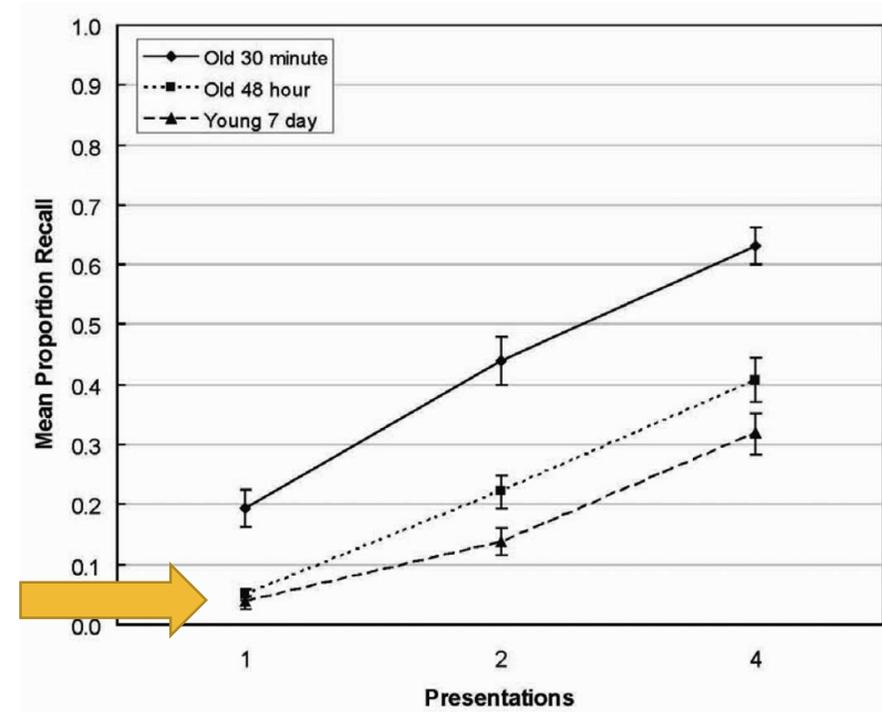
- Some studies show age-related deficits in FOK accuracy favoring young adults
 - Thomas et al., 2011; Souchay et al., 2007; Sacher et al., 2013, 2014
- Others show *age-equivalence*
 - MacLaverly & Hertzog, 2009; Hertzog, Dunlosky, & Sinclair, 2010; Eakin, Hertzog, & Harris, 2014; Hertzog, Fulton, & Dunlosky, in prep.



Aging and FOKs

Why are there differences in these results?

1. FOK deficits may be memory dependent
 - Dunlosky & Metcalfe (2009) argue that FOK comparisons should only be made when recall performance levels are *equated*
 - Hertzog, Dunlosky, & Sinclair (2010)
 - Equated cued-recall performance
 - YAs – 7-day delay
 - OAs – 30-minute & 2-day delays
 - FOK age-equivalence



Aging and FOKs

Why are there differences in these results?

1. FOK deficits may be memory dependent

- Older adults may be engaging in poor encoding strategies
- Lower-quality encoding → reduction of access to cues diagnostic of FOK
- Non-criterial recollection hypothesis
 - FOKs are based in part on information retrieved about:
 - Original encoding context, or
 - Features related to target
- Better non-criterial recollection = better FOKs

Non-criterial recollection

- Hertzog, Fulton, Sinclair, & Dunlosky (2014)
 - Hypothesis: recall of encoding strategy will enhance FOKs (YAs only)
- Procedure:
 - STUDY (1x or 3x)
 - Ss asked to generate images of paired associates (concrete or abstract)
 - TEST (after 7-day delay)
 - Cued-recall + FOK
 - Strategy recall
 - Recognition (4AFC)

Non-criterial recollection

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 - Strategy recall
 - Recognition (4AFC)
- Results
- Multilevel regression model suggests that:
 - Greater recall of mediator used at study led to greater recognition memory performance for items not previously recalled
- Conclusion:
 - Predictive accuracy of FOKs was influenced by strategy recall
 - Consistent with non-criterial recollection hypothesis

Aging and FOKs

Why are there differences in these results?

2. FOK deficits due to unanticipated memory effects at cued-recall attempt & FOK

- Sacher, Isingrini, & Taconnat (2013)
 - Hypothesis: Divided attention in YAs will mimic FOK deficits in OAs
- Participants:
 - 20 YAs at “full attention”
 - 20 YAs with DA at encoding
 - 20 YAs with DA during FOK
 - 60 OAs
- Procedure:
 - STUDY
 - 60 weakly-associated paired nouns
 - TEST
 - Verbal cued-recall test
 - FOK judgment
 - **5AFC recognition task**
 - **Semantically-similar distractors**

Aging and FOKs

Why are there differences in these results?

2. FOK deficits due to unanticipated memory effects at cued-recall attempt & FOK

- Sacher, Isingrini, & Taconnat (2013)
 - Hypothesis: Divided attention in YAs will mimic FOK deficits in OAs
- Results:
 - DA at encoding in YAs mimics age-related declines in FOK accuracy
- **Problem:**
 - **OAs more susceptible to interference effects in 5AFC**
 - **Produces confusion about a specific target when presented with related alternative words**

Our hypothesis

Age differences in FOK accuracy (resolution) can be overcome by using an encoding process that maximizes specific memory trace to a target

- Will enhance cues diagnostic to FOKs
 - i.e., Non-criterial recollection hypothesis
- Will reduce interference effects
 - Better encoding process → age invariance in FOK resolution
 - Age differences in FOK resolution for items replicated from Sacher et al.'s (2013)

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Current experiment

Hypothesis: Age differences in FOK accuracy can be overcome by using an encoding process that maximizes specific memory trace to a target

Solution: Manipulate the use of “distinctive” vs. “similar” encoding at study

Example:

Distinctive feature:

“Yellow”



Similar feature:

“Sweet taste”

Current experiment - methods

PART 1

Provide category label → *Study target word* → *Provide similar/distinct feature*

APPLE
BANANA
ORANGE
GRAPE

6s



“What is the category?”

6s



“Our category label is: FRUIT”

6s

APPLE
BANANA
ORANGE
GRAPE

10s

APPLE
BANANA
ORANGE
GRAPE

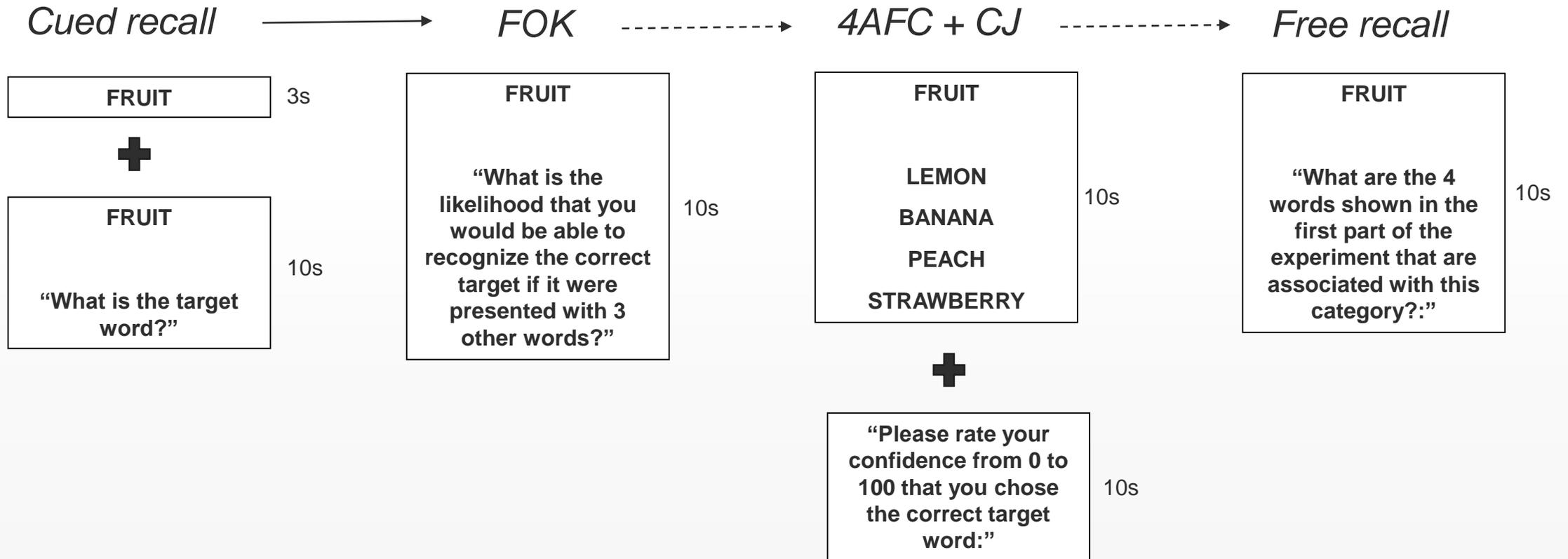


“Think of one memory aid word that you know is **DISTINCT** about the word in red compared to the other words:”

10s

Current experiment - methods

PART 2



Current experiment

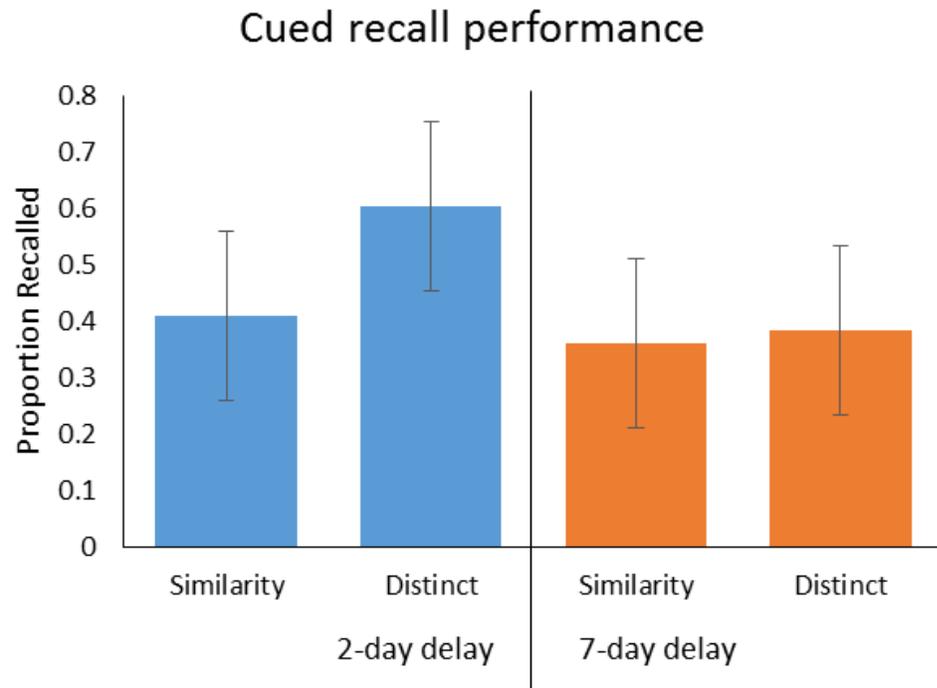
We anticipate that using a *distinctive* encoding strategy will help older adults make more accurate FOK predictions

- Semantic items likely to create age differences in FOK resolution in *similarity* encoding condition
- Age differences in FOK resolution should be overcome in *distinctive* encoding condition
 - Non-criterial recollection hypothesis (Hertzog et al., 2014)

Current experiment – Pilot testing

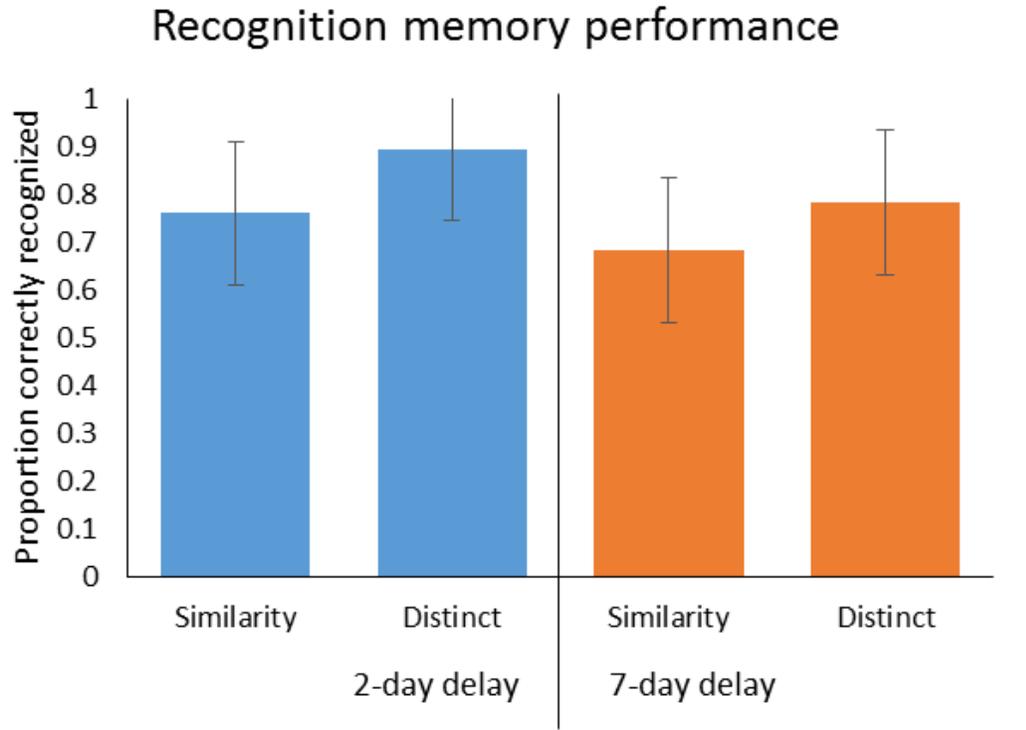
- **Differential delays:**
 - We have piloted young adults (GT students) with 2-day and 7-day delays between Part 1 (study) and Part 2 (test) of the experiment
- Essential to reduce cued-recall performance in YAs to:
 - Bring recall performance from ceiling (better recall performance = fewer FOKs)
 - Equate recall performance between YAs and OAs

Current experiment – Cued recall results



- 2-day delay
 - Similarity: $M = .41$; $SD = .19$
 - Distinct: $M = .60$; $SD = .19$
- 7-day delay
 - Similarity: $M = .36$; $SD = .15$
 - Distinct: $M = .38$; $SD = .13$

Current experiment – Recognition results



- 2-day delay
 - Similarity: $M = .76$; $SD = .16$
 - Distinct: $M = .89$; $SD = .09$
- 7-day delay
 - Similarity: $M = .68$; $SD = .14$
 - Distinct: $M = .78$; $SD = .12$

Current experiment – Mean FOKs

Mean FOKs for unrecalled items

	Similarity		Difference	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
2-day delay	47.46	16.23	42.60	18.89
7-day delay	49.13	18.81	47.44	16.82

Current experiment – FOK resolution

Mean gamma correlations between recognition memory performance and FOKs for unrecalled items

	Similarity		Difference	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
2-day delay	.05	.26	.12	.45
7-day delay	.12	.53	.22	.28

Current experiment – Confidence judgments (CJs)

- We use confidence judgments (CJs) after each recognition test trial to validate FOKs
- CJs are used to scale the degree of recollective experience participants have during recognition memory (i.e. Rotello et al., 2005)

Mean gamma correlations between recognition memory performance and CJs for unrecalled items

	Similarity		Difference	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
2-day delay	.52	.32	.79	.24
7-day delay	.31	.40	.61	.33

Current experiment – Confidence judgments (CJs)

Mean correlations between FOKs and CJs
for unrecalled items

	Similarity		Difference	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
2-day delay	.08	.28	.02	.24
7-day delay	.22	.26	.23	.18

Next steps

- Run older participants at 1-hour delay
- Mixture of distinctive & similarity-based encoding strategies within subjects (half & half)
 - Differences within participants' judgments will be easier to detect, which will improve the gamma analysis
 - Similar to technique used in Hines dissertation

