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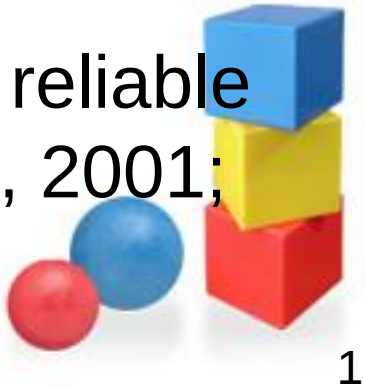
Age Differences in Source Memory for Scientific Web-Texts

Ryuta ISEKI and Takashi KUSUMI

Kyoto University, Japan

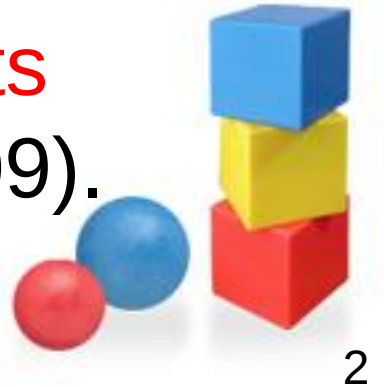
Importance of Source Information

- Various information in Internet: The information are sometimes controversial and contradict each other.
  - Searching for reliable source helps people to understand their topics properly.
- Sourcing skills relate to comprehension.
  - Sourcing facilitates deep comprehension (Bråten et al., 2009).
  - Students can distinguish between reliable and unreliable source (Brem et al., 2001; Ferguson et al., 2009).



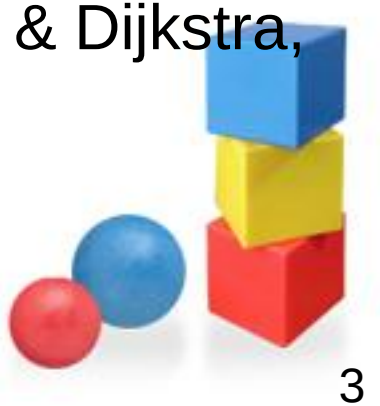
Source Memory of Multiple texts

- Source memory in web communication: In Internet browsing, scientific information are presented by many sources.
  - People is required to remember the correct source of the texts in order to judge the reliability of the information.
- There are few studies that examine source memory of multiple texts directly (e.g., Bråten et al., 2009).



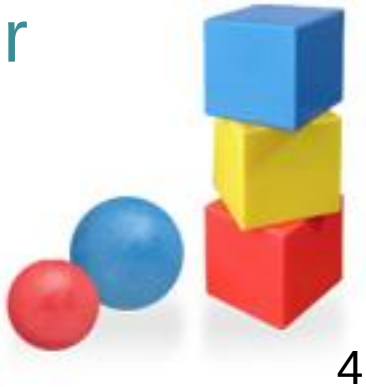
Selective Aging Effect in Memory

- Older adults sometimes show comparable or superior memory performance to younger adults.
  - Aging effect was found for source memory, but not for fact memory (e.g., Schacter et al., 1991).
  - Aging effect was found for text processing at lower levels (surface form and textbase), but not for text processing at higher level (situation model). (Radvansky, 1999; Radvansky & Dijkstra, 2007, for reviews.)
- How about for source memory of multiple texts?



Purpose of the Study

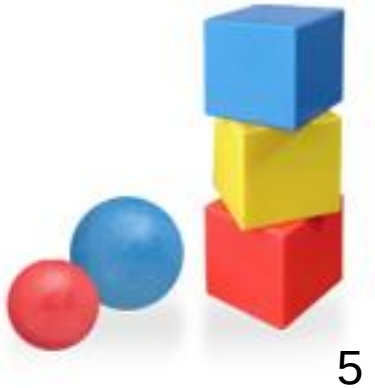
- The present study investigated the possible effects of aging on source memory of multiple scientific texts.
  - Do older adults show the decrement of memory for texts, compared to younger adults?
    - ✓Is the effect specific to the source?
    - ✓When does the effect occur?
  - Do older adults show any bias for source judgment?
    - ✓Do older adults prefer to experts or laypersons either?



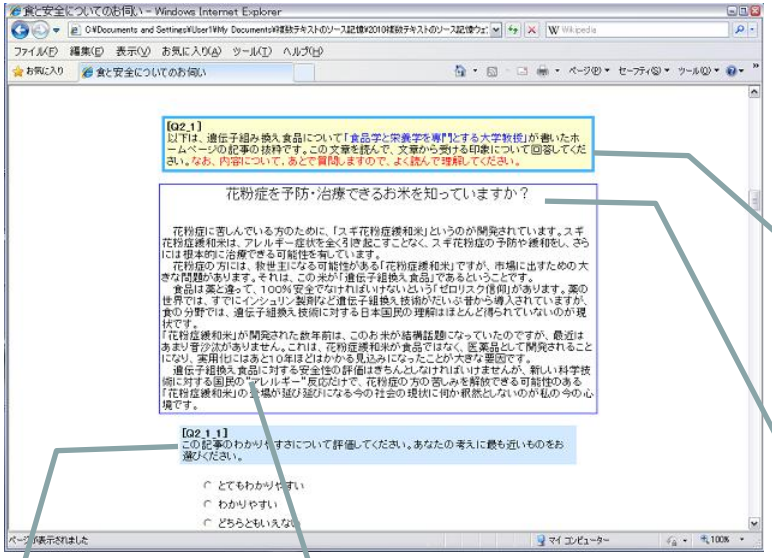
METHOD

- Participants: Japanese adults aged 20s, 30s, 40s, 50s, and 60s participated in the experiment (*ns* = 295, 293, 299, 300, 300, respectively).
- Materials: The participants read 2 (*topics*: high importance or low importance) x 2 (*authors*: expert or layperson) types of short texts. These texts was extracted from actual web-pages.

This experiment was administered in web-based. The participants run the tasks on their PC.



Procedure: Study Phase

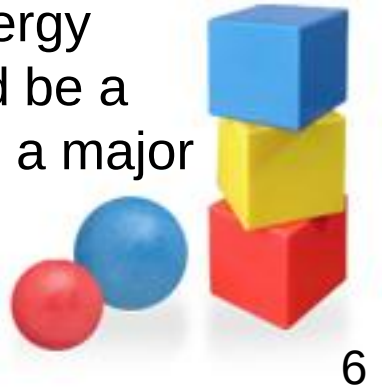


Instruction and author information: “Below is an excerpt from the web-page article that was written by professor who major in dietetics and nutrition science. Read it and rate for it impression.”

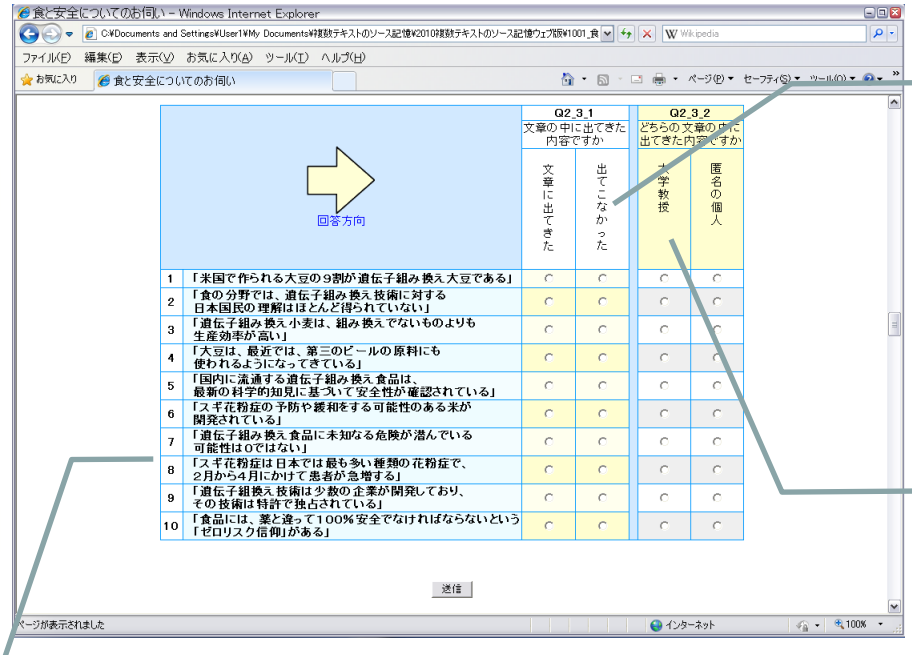
Title: “Do you know the rice that prevents and remedies pollen allergy?”

Orienting task: “Please rate the article for its read-ability. Check one of the options.” (5 point scale)

Main text: “For pollen allergy sufferers, the rice relieving pollen allergy is developing. The rice is possible to prevent, relief, and even cure pollen allergy without inducing allergy syndrome. Although the rice could be a deliverer for the sufferers, there is a major problem for taking it to market. It is that the rice is one of the genetically-modified food. …”



Procedure: Test Phase

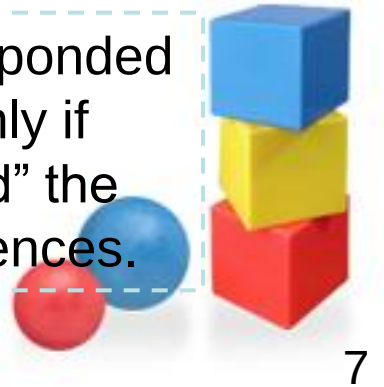


Recognition Test: “Did you read the sentence in the text at previous display?” The participants checked “read” or “not read”.

Source Test: “Which texts referred to the sentence?” The participants checked one of two options (e.g., “professor” or “anonymous”).

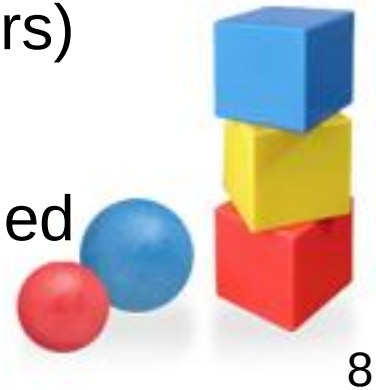
Test sentences: Ten sentences were extracted from texts for each topic (e.g., “The rice relieving pollen allergy is developing”).

The participants responded to the source test only if they answered “read” the corresponding sentences.



Details of Materials

- High importance: "genetically-modified food"
  - Expert: "*Do you know the rice that prevents pollen allergy?*" (573 letters)
  - Layperson: "*By now, would you admit genetically-modified foods?*" (594 letters)
- Low importance: "space development"
  - Expert: "*Mechanisms of earth observing satellites*" (527 letters)
  - Layperson: "*Launching space solar-electric power generation in Japan*" (574 letters)



Pilot survey showed that genetically-modified food is more important for everyday life than space development.

RESULTS

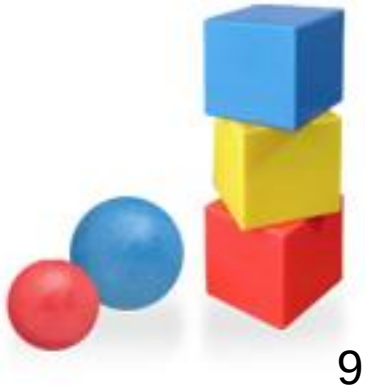
- Response frequency for high-importance texts.

Source \ Response	Expert	Layperson	New
Expert	2832	987	642
Layperson	742	2574	1145
New	344	351	5253

Red numbers indicate accurate responses.

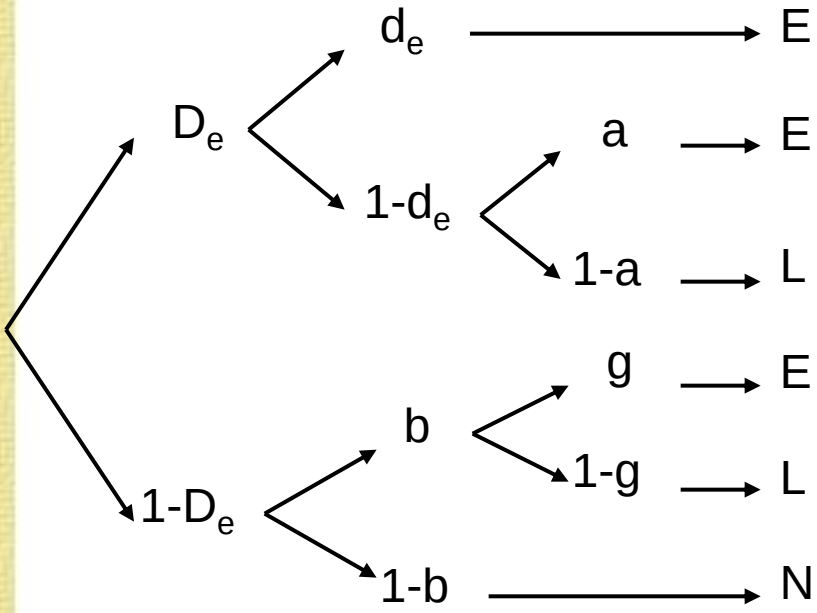
- Response frequency for low-importance texts.

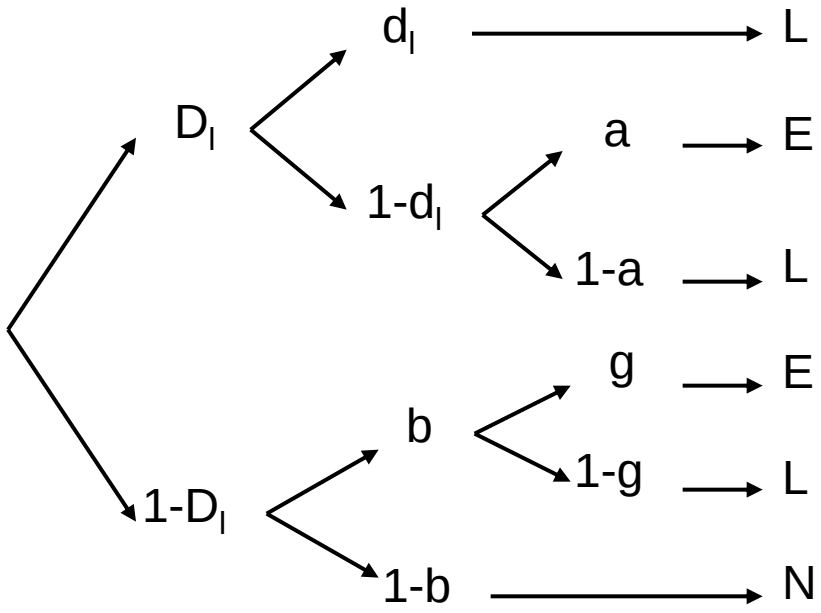
Source \ Response	Expert	Layperson	New
Expert	3138	437	886
Layperson	609	2564	1288
New	285	195	5468

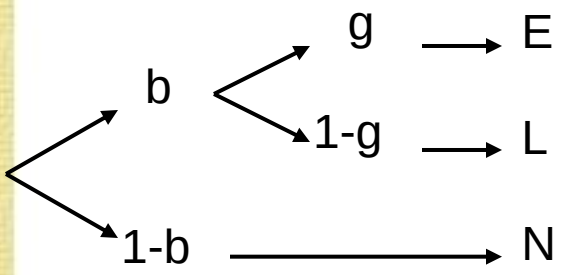


Multinomial Processing Tree Model

- MPT model for Source monitoring paradigm was used (Batchelder & Riefer, 1990).

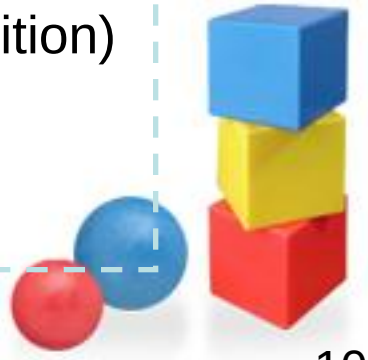






PARAMETERS

D = item detection (recognition)
d = source discrimination
b = response bias
a, g = guessing



- E, L, N represent types of response (Expert, Layperson, or New item). Subscript indicate expert or layperson either.

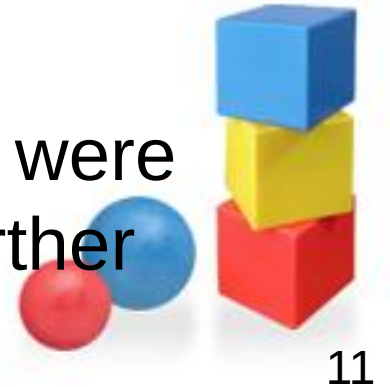
General Patterns

Parameters estimated for two types of texts.

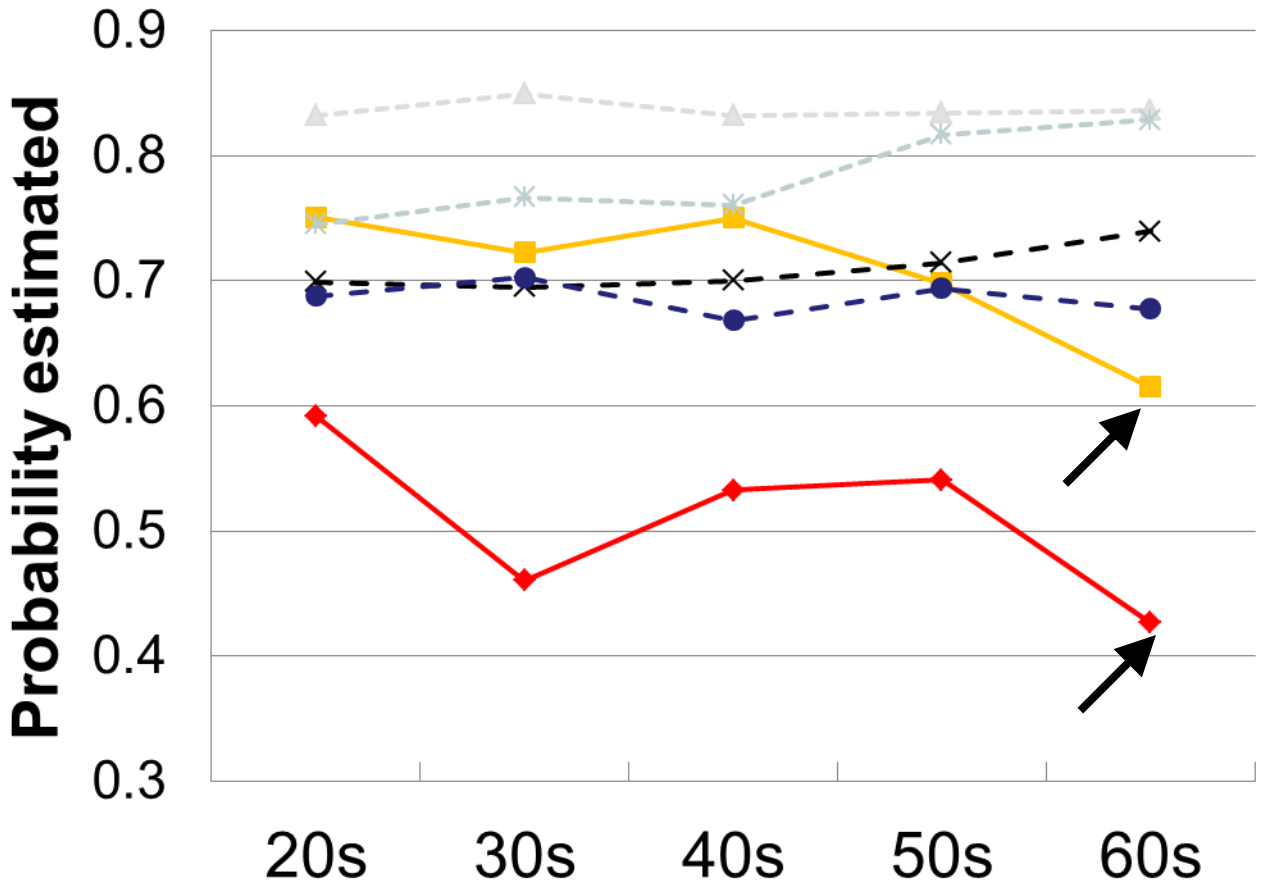
	High	Low
D_E	.84	.78
D_L	.71	.69
d	.53	.71
a	.47	.60
b	.12	.08
G^2	2.97	.14
p value	.08	.71

G^2 --- goodness of fit index

- MPT models accepted assumed below.
  - Detection rates were different among two authors (expert or layperson).
  - Guessing parameters were same whether detection was successful or not.
- The above assumptions were applied to further analyses.

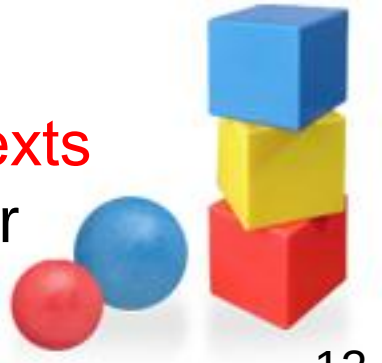


Aging of Source Discrimination

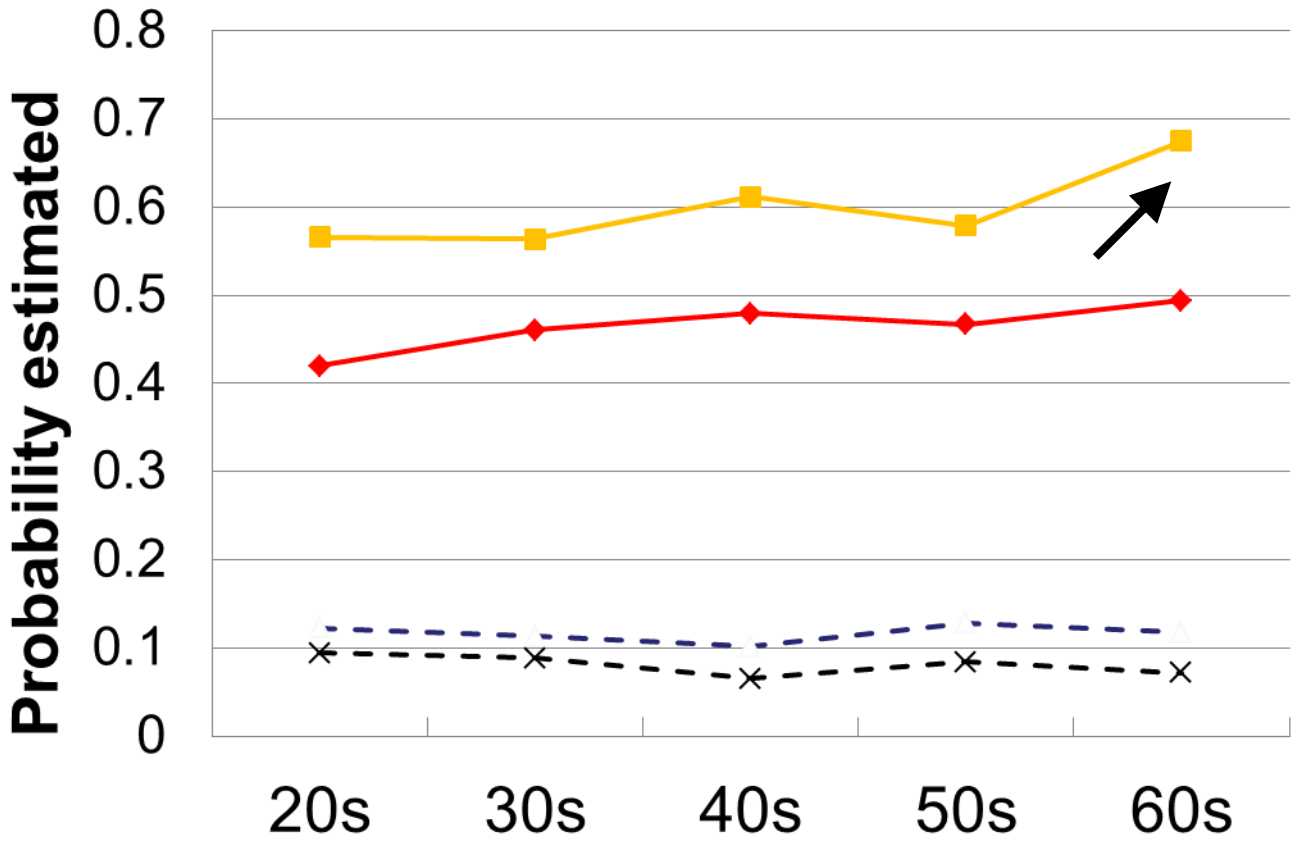


d = source discrimination
D = item detection

- The 60s' ability to discriminate source of texts was largely decreased compared to the other age groups.

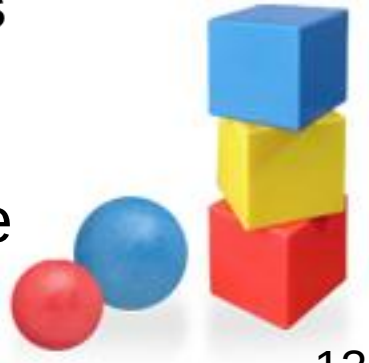


Aging of Source Guessing



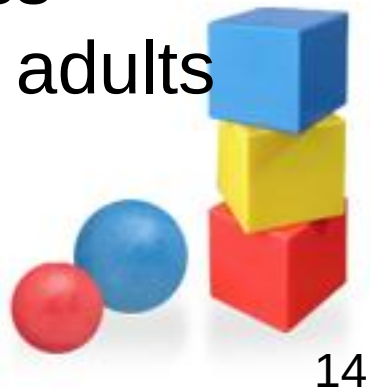
a = guessing (attributing source to expert)
b = response bias (false alarm)

- The 60s' source guessing for space development was increased compared to the other age groups.



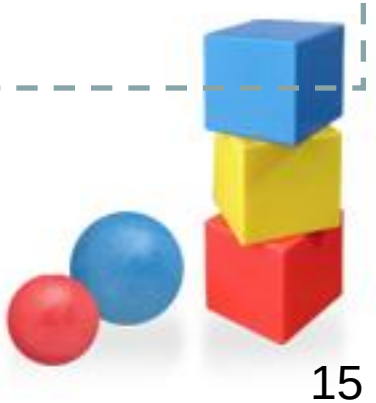
DISCUSSION

- Only 60s group showed salient decrement of memory for multiple texts.
  - Decrement was specific to source memory.
  - No differences were observed for recognition memory.
- Guessing parameters for low-importance texts changed in 60s.
  - The feeling that the topic was less important might induce the older adults to less elaborate processing.



CONCLUSION

- Older adults aged 60s showed decrement for source memory in reading multiple web-texts about scientific topics.
- The older tends to consider less important information as written by experts when they did not remember its correct source.



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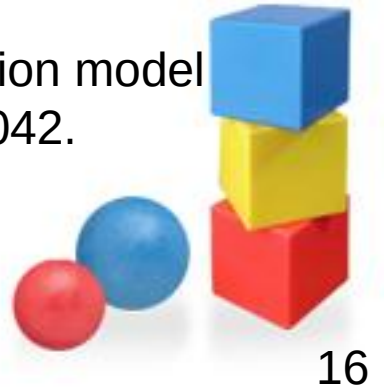

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Kyoto University, Japan

Abstract

In Internet browsing, scientific information is presented by many sources. People are required to remember the correct source of the texts in order to judge the reliability of the information. However, there are few studies that examine source memory of multiple texts directly. In addition, it is unclear whether the source memory of texts is affected by aging. The present study investigated the effects of aging on source memory for multiple scientific texts. Results showed that the older adults aged 60s had poor memory for sources when reading scientific web-texts. And, they have a tendency to consider the les important information as written by experts when they did not remember its correct source. These findings suggested that the monitoring and memorization for source of texts should be more explored in the context of scientific literacy, as well as in the context of cognitive aging.

Author Contact Information

Ryuta ISEKI	--------	riseki@educ.kyoto-u.ac.jp
Takashi KUSUMI	--------	kusumi@educ.kyoto-u.ac.jp

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