Two Systems of Thinking Across Cultures

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Assumption in Cognitive Science

- Cultural variability in content of thinking
- But universality in process
- This assumption was rarely tested empirically
- Estimated 90-95% of all samples in psychology are Western people
- Recent cross cultural evidence

Two Systems of Reasoning

Formal **(e.g., Bruner, Goodnow, & Austin, 1956)**

- symbolic
- rule-application
- e.g., deductive reasoning

Intuitive **(e.g., Smith & Medin, 1981)**

- experience
- similarity relations
- e.g., exemplar-categorization

Modes of Thought in Two Cultural Areas

e.g., Nisbett, Peng, Choi, & Norenzayan, 2001

Western independent cultures:
Analytic predominates

East Asian interdependent cultures:
Holistic/ intuitive predominates

Questions

- Are there cultural differences in process? YES
- Both conceptual and perceptual tasks? YES
- Are these differences result of artefacts NO
- Proximate explanation for the diffs? MAYBE

Cultural Differences in Modes of Thought

- Conceptual tasks
- Attention/perceptual tasks
- Evidence from additional cultures
- Explanations for the cognitive differences

Examples of Deductive Arguments

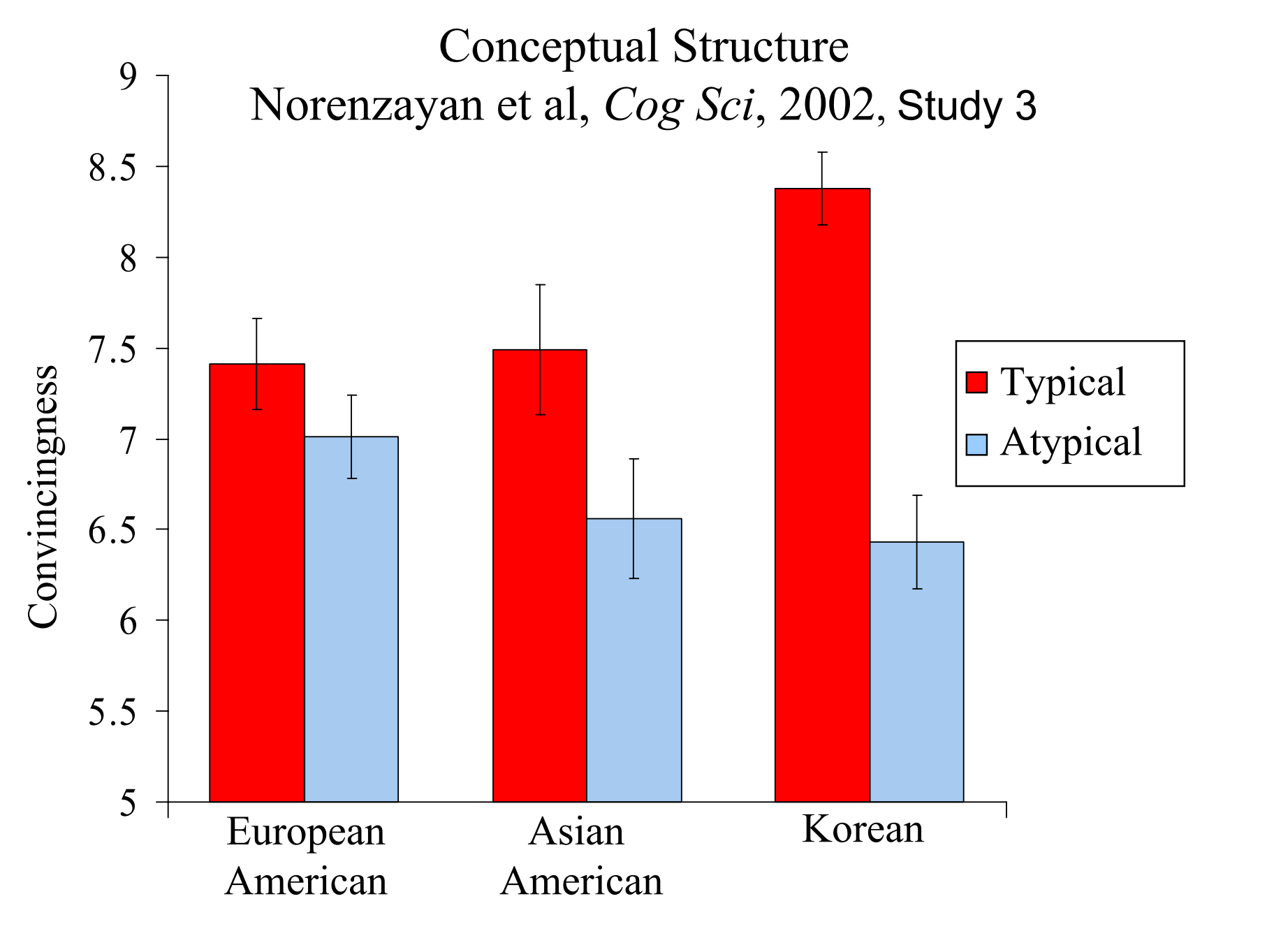
Typical:

All birds have an ulnar artery
Therefore all EAGLES have an ulnar artery

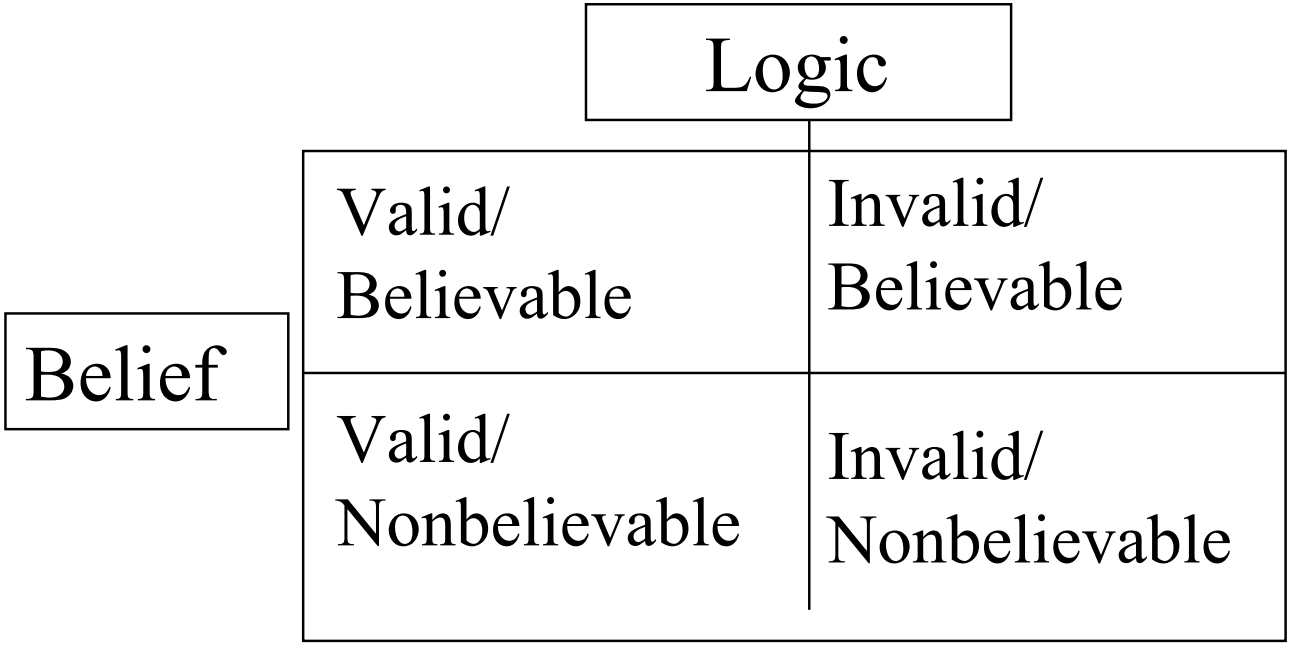
Atypical:

All birds have an ulnar artery
Therefore all PENGUINS have an ulnar artery

0-----2-----3-----4-----5-----6-----7-----8-----9-----10
Very Unconvincing **Very Convincing**


Conceptual Structure
Norenzayan et al, Cog Sci, 2002, Study 3
Convincingness
9
8.5
8
7.5
7
6.5
6
5.5
5
Typical
Atypical
European American
Asian American
Korean

Design


Logic
Belief
Valid/
Believable
Invalid/
Believable
Valid/
Nonbelievable
Invalid/
Nonbelievable

Examples of Arguments

Valid/believable conclusion:

All living things grow
Computers do not grow
Computers are not living things

Does conclusion follow logically from premises?

YES or NO

Examples of Arguments

Valid/nonbelievable conclusion:

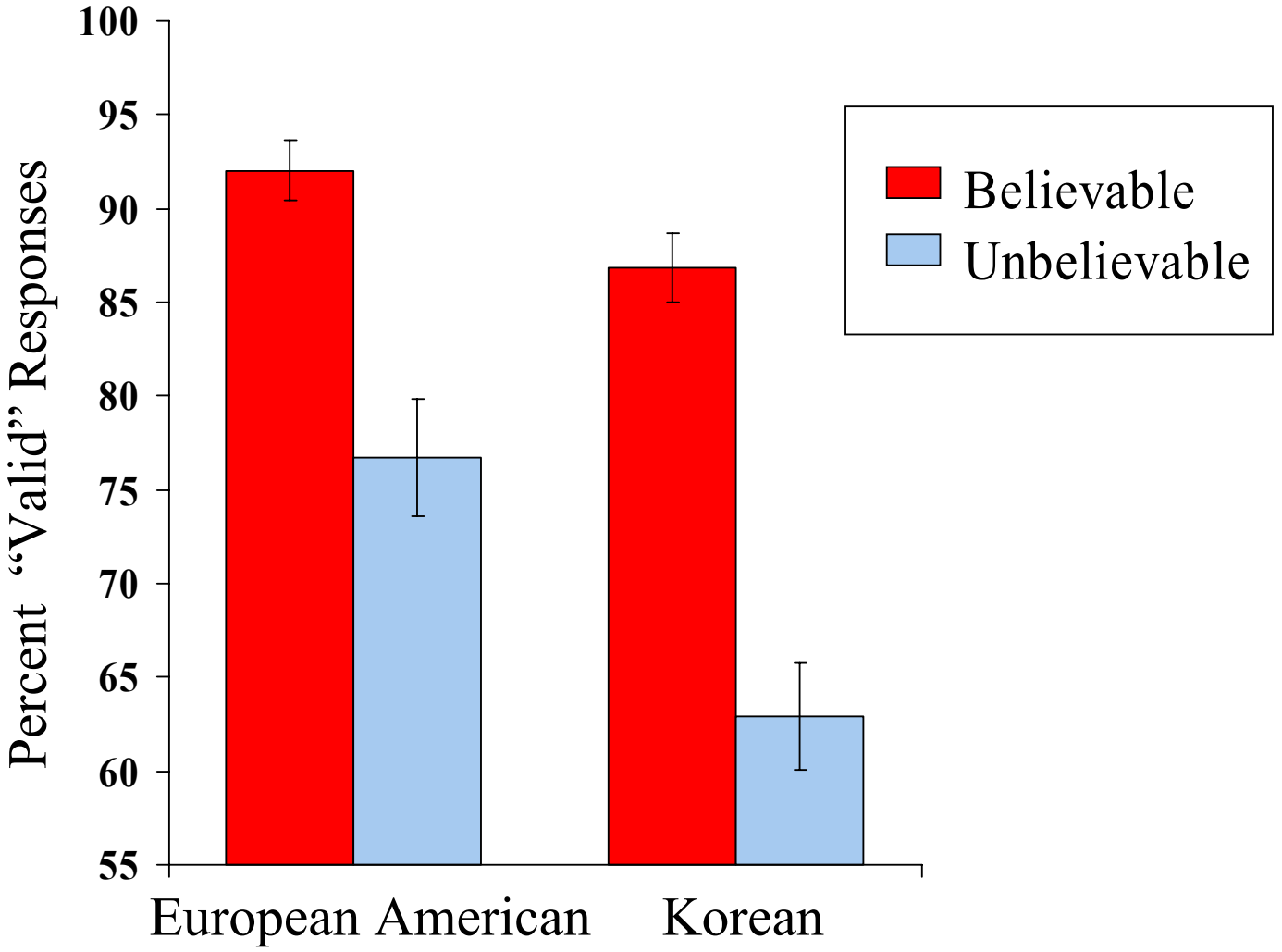
All things made of plants are good for the health
Cigarettes are things made of plants
Cigarettes are good for the health

Does conclusion follow logically from premises?

YES or NO

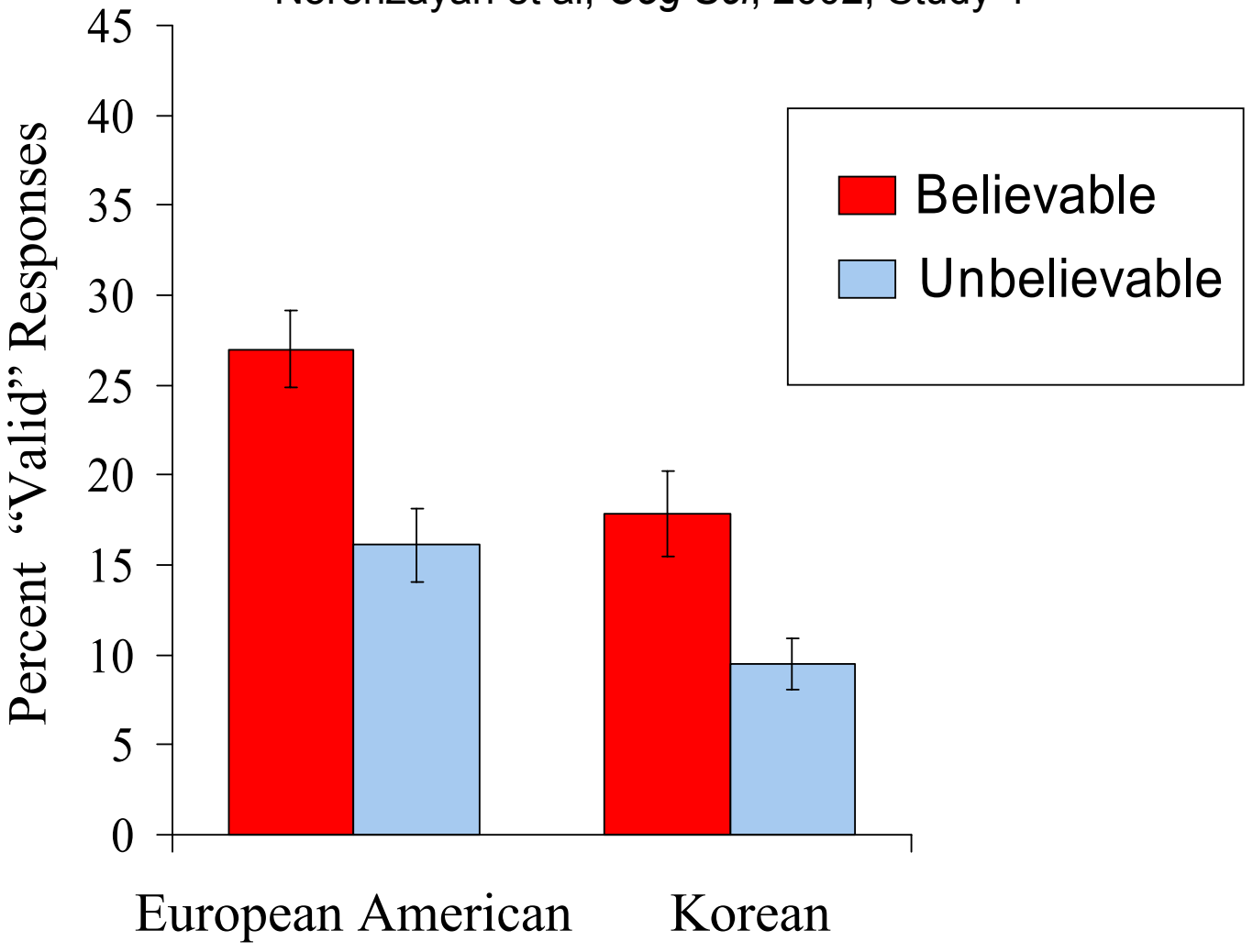
Concrete VALID Arguments

Norenzayan et al, *Cog Sci*, 2002, Study 4



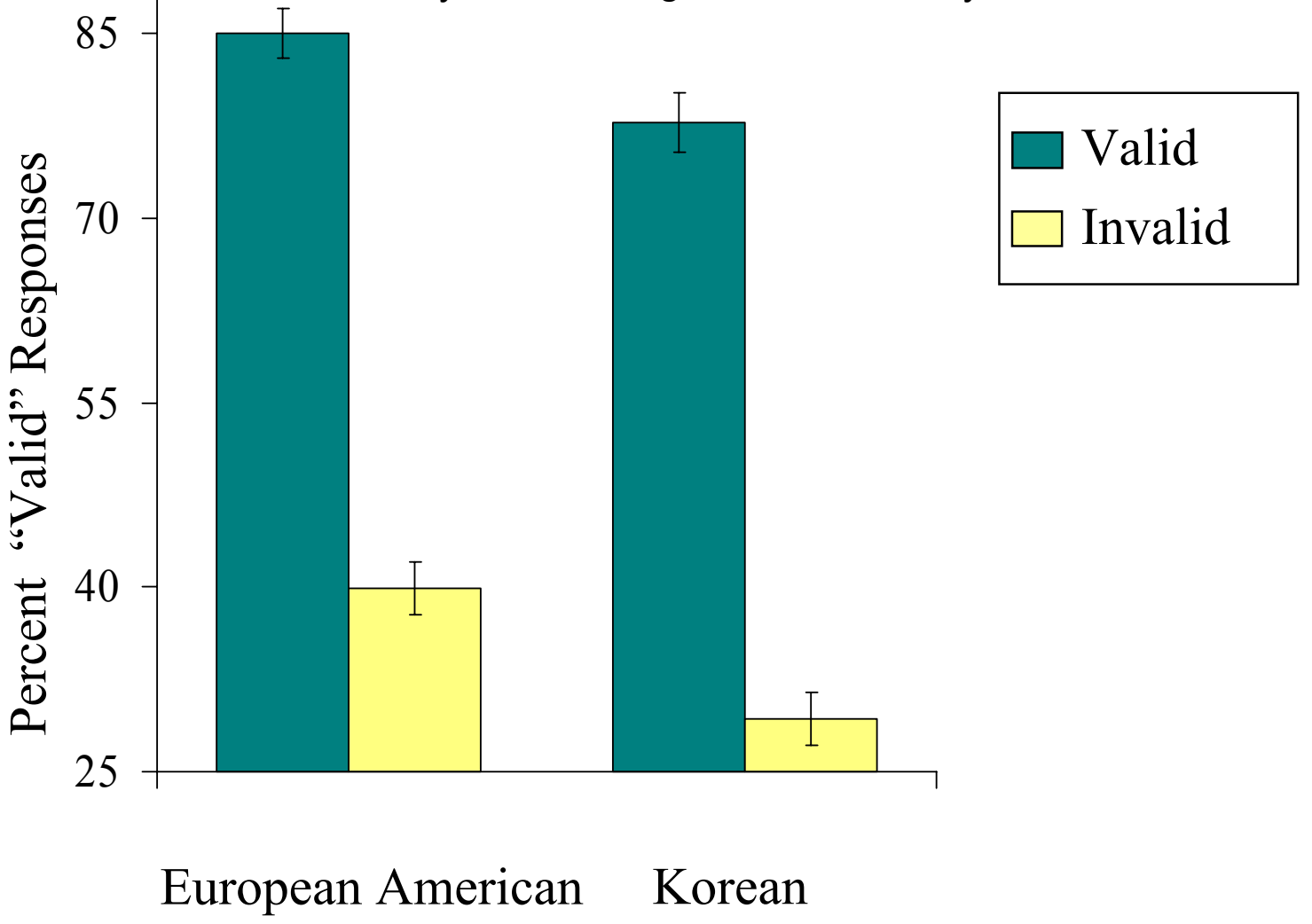
Concrete Invalid Arguments

Norenzayan et al, *Cog Sci*, 2002, Study 4



Abstract Arguments

Norenzayan et al, *Cog Sci*, 2002, Study 4



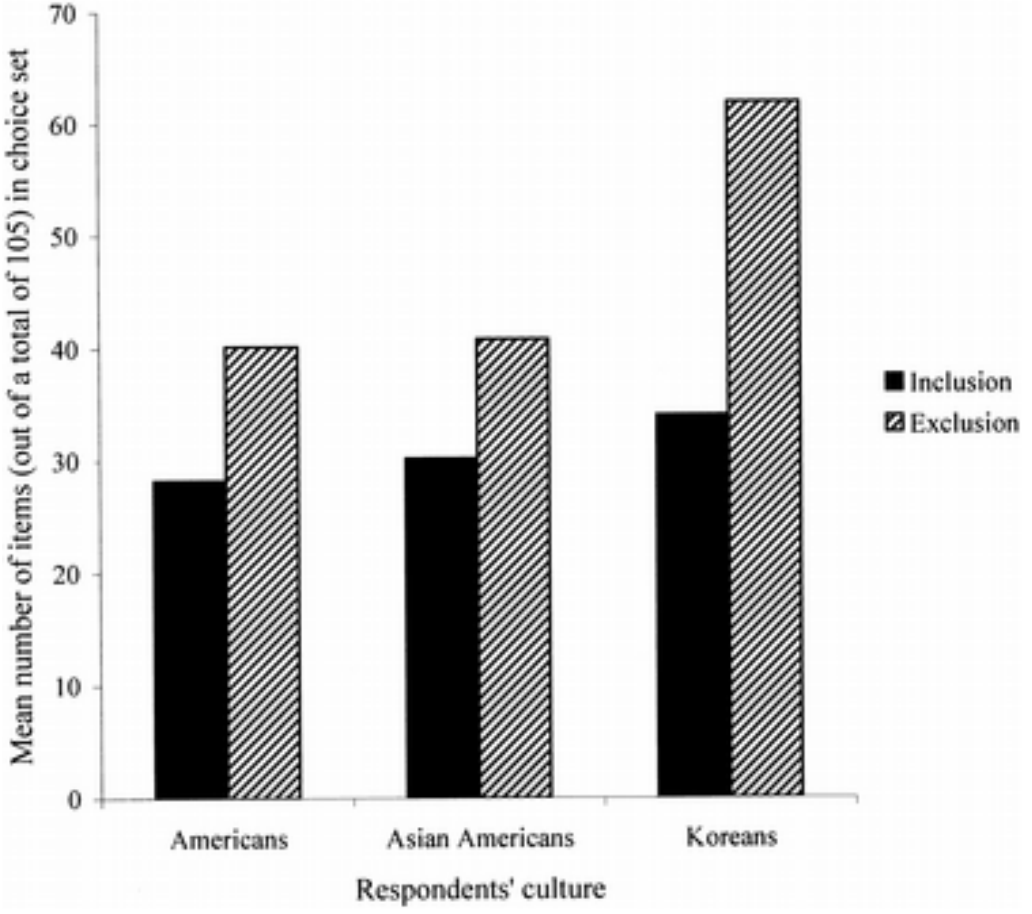
Choice Set

Choi et al, 2003, *JPSP*

- Koreans and Americans read murder case
- Then evaluated a list of clues
- Asked to include relevant info or exclude irrelevant info
- Info was equally familiar to both cultures

Choice Set

Choi et al, 2003, *JPSP*



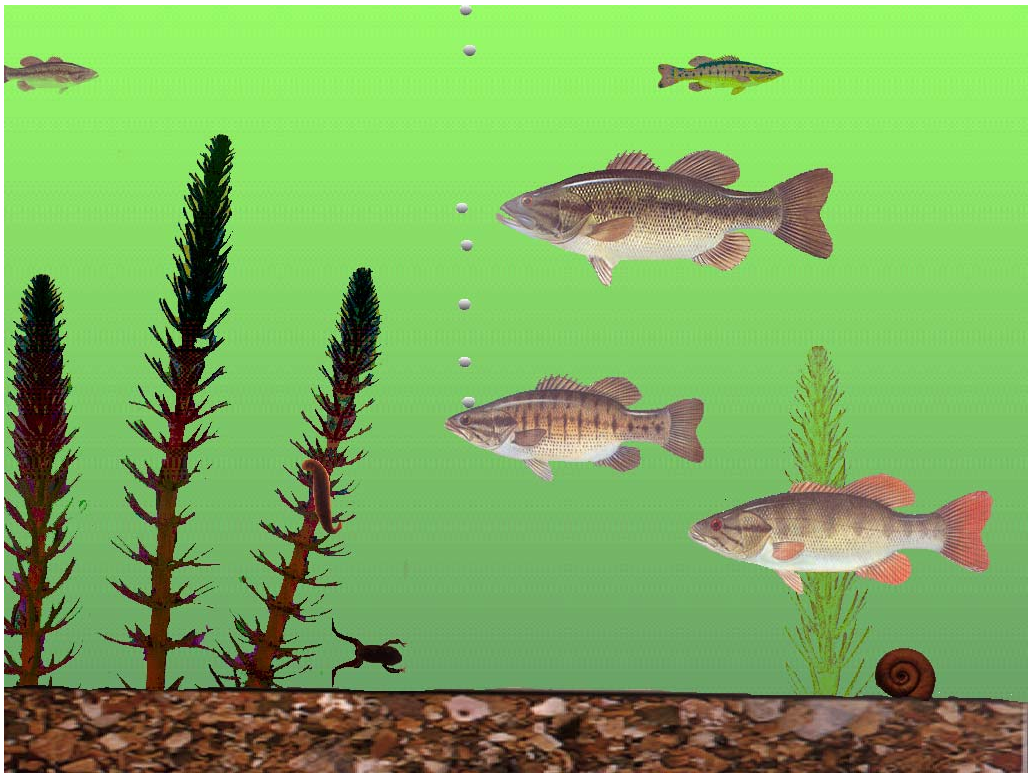
Koreans kept a lot more info. relevant to a murder case than Americans when asked to exclude than include

Differences in Attention/Perception

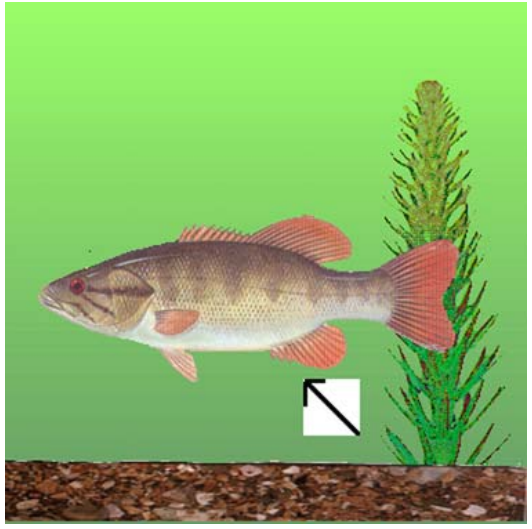
- Perceptual memory
- Similarity ratings
- Categorization
- Eye movements

Seeing the Object and the Field (Masuda & Nisbett, 2001) Phase 1: Recall Task

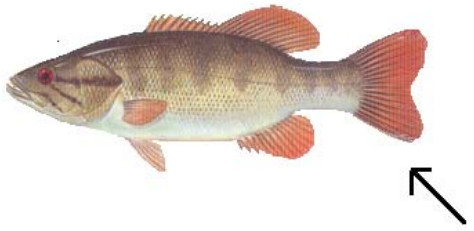
41 American participants at the University of Michigan and 44 Japanese participants at Kyoto University, Japan.



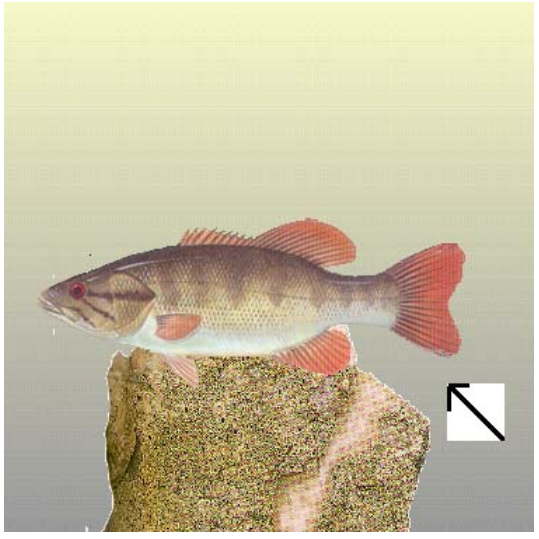
Phase 2: Recognition Task



Fish with Original Background



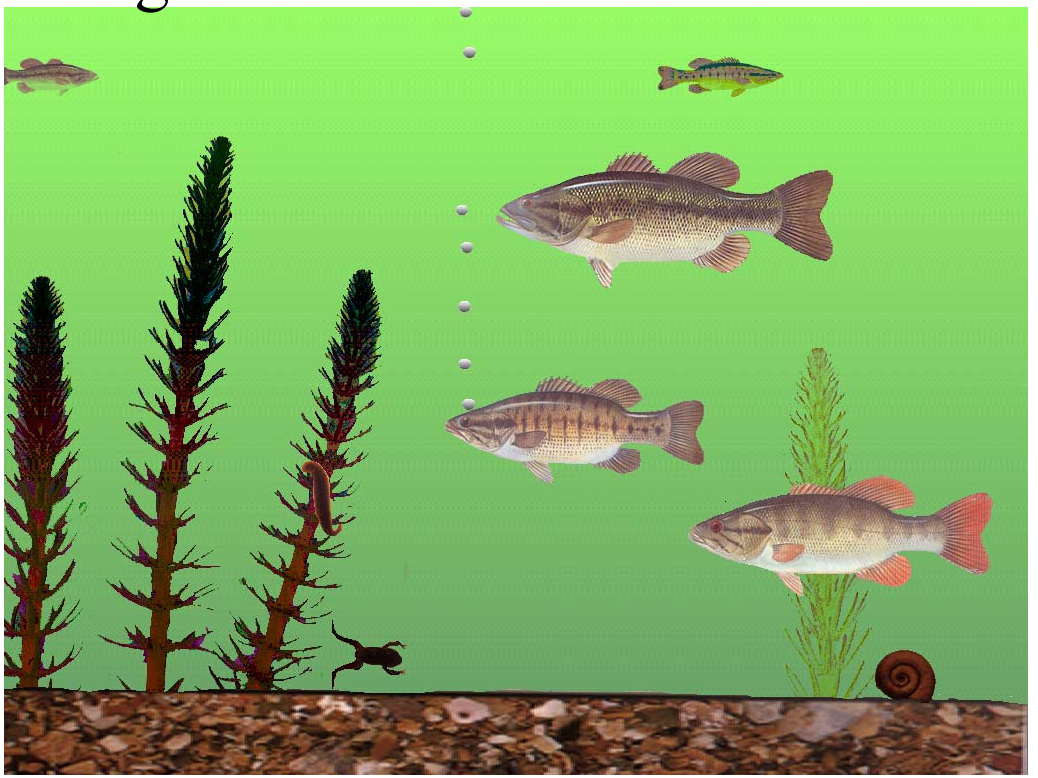
Fish with No Background



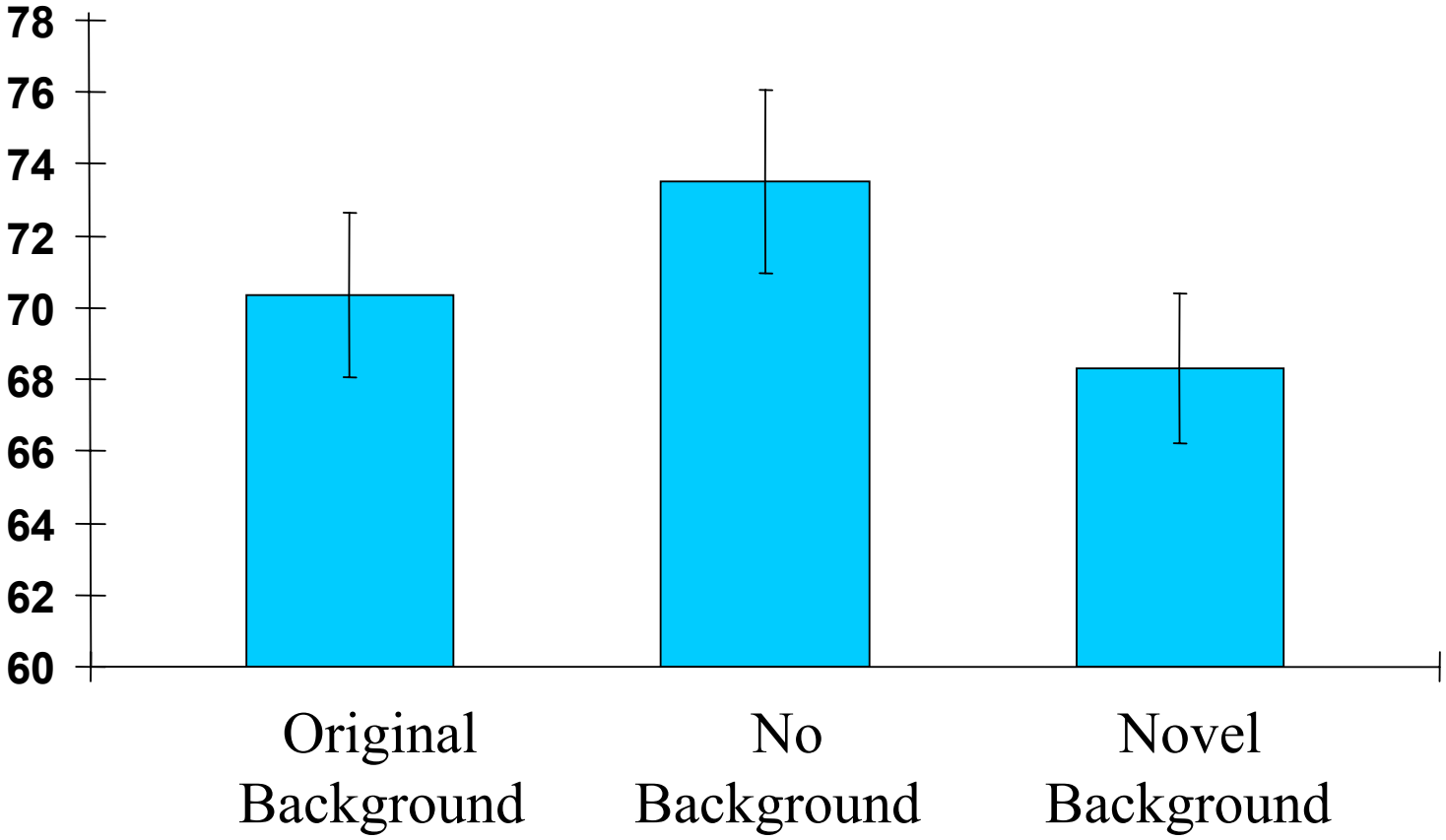
Fish with Novel Background

Seeing the Object and the Field (Masuda & Nisbett, 2001) Phase 1: Recall Task

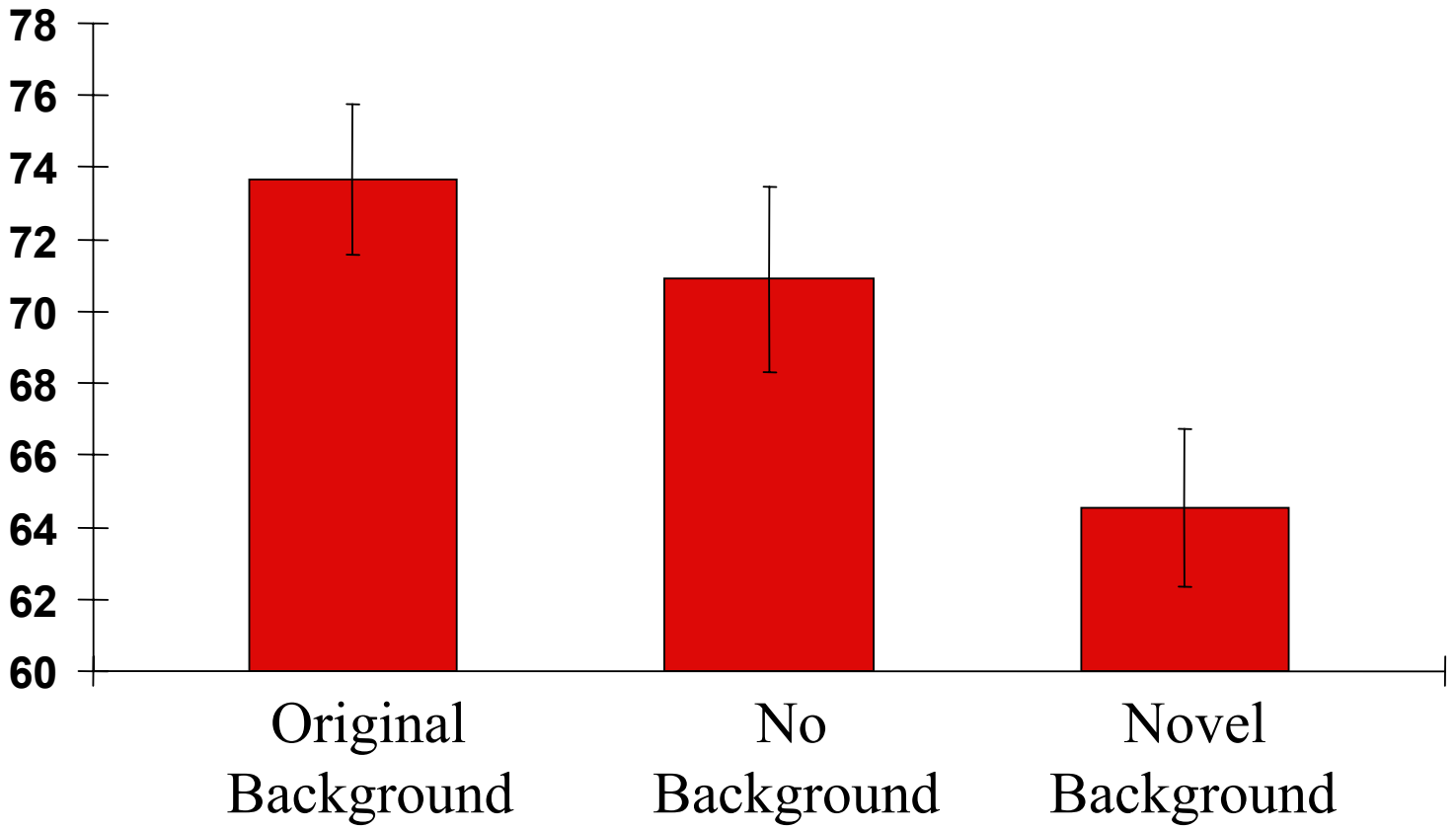
Japanese and Americans recalled equal amounts of detail about focal fish, but Japanese recalled 70 % more background information



Previously Seen Objects (USA)

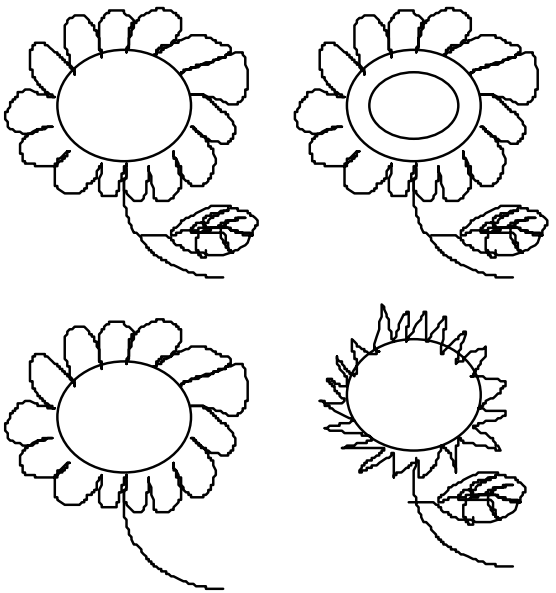


Previously Seen Objects (Japan)

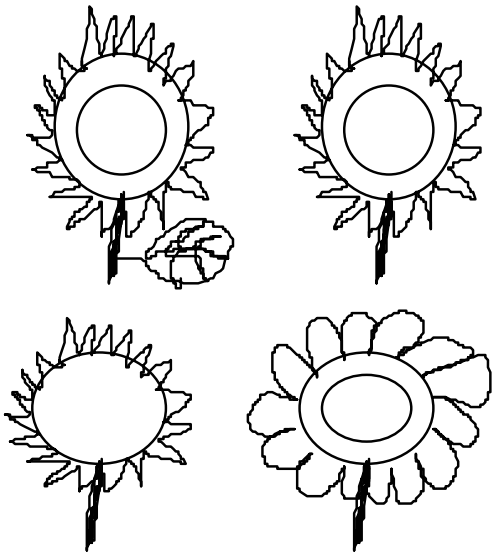


Procedure: Trial Example

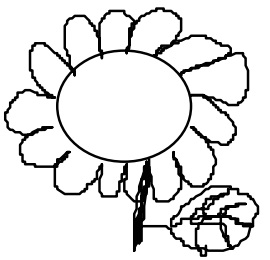
Group 1



Group 2

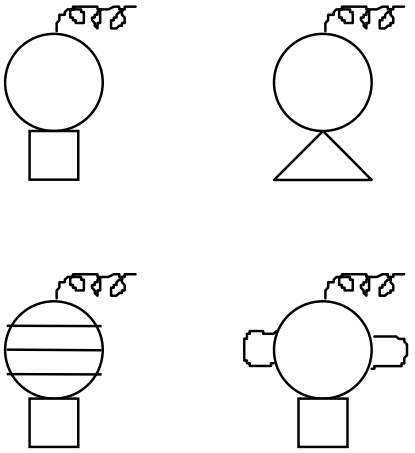


Target Object

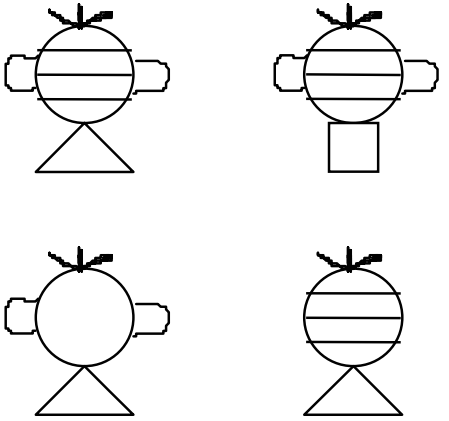


Procedure: Trial Example

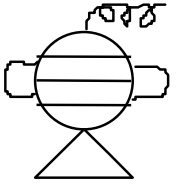
Group 1



Group 2

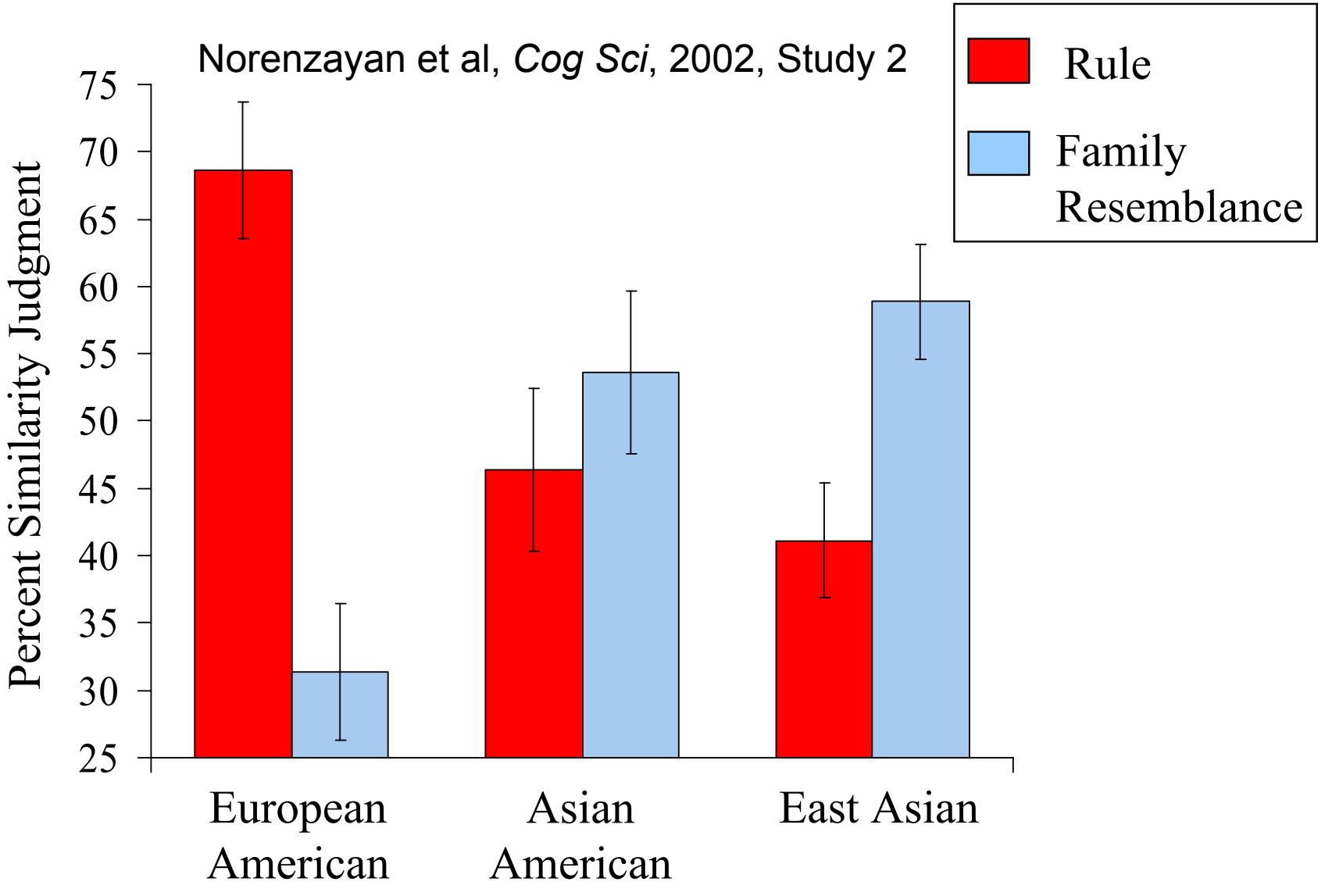


Target Object



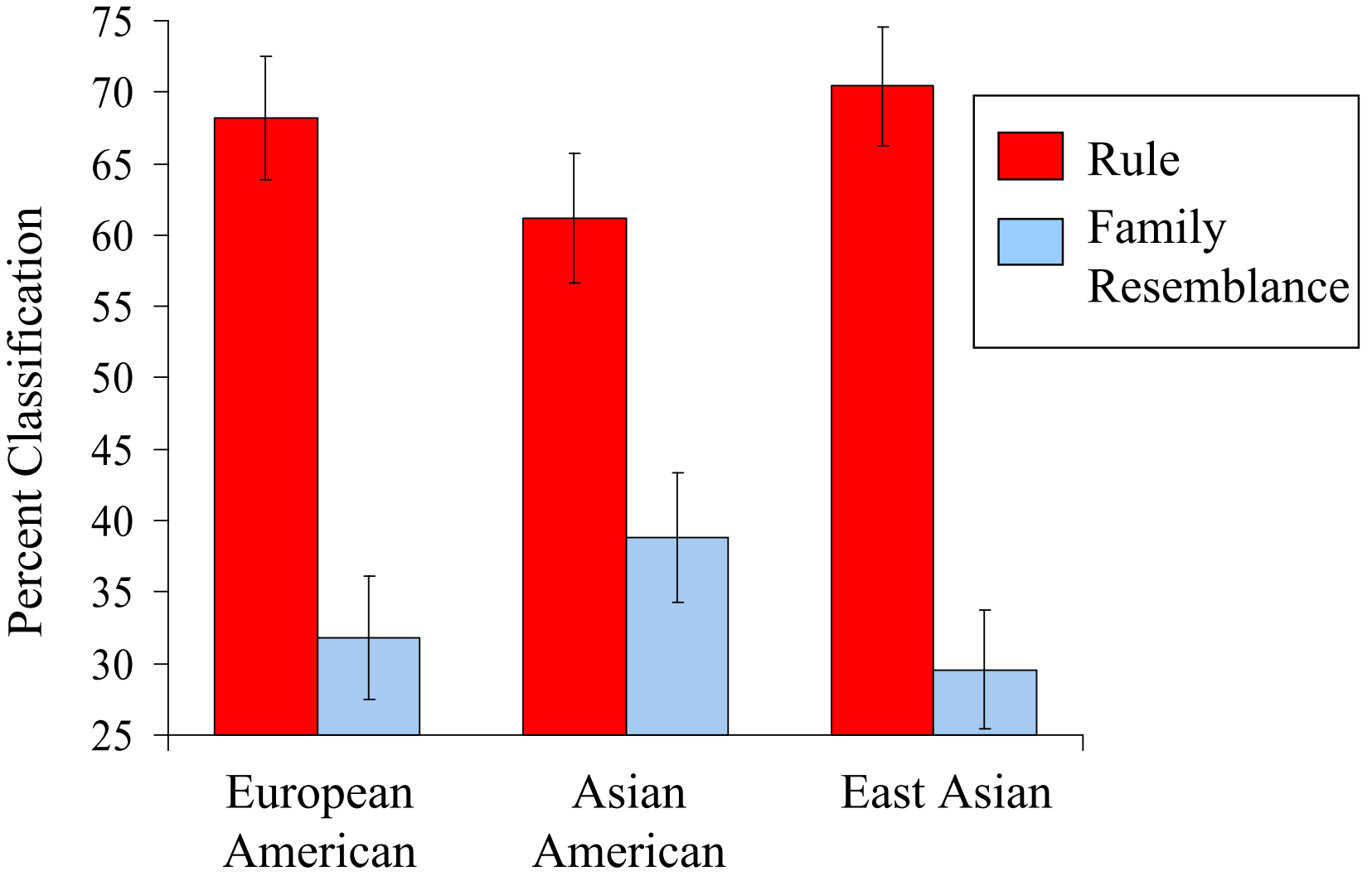
Similarity Judgments

Norenzayan et al, *Cog Sci*, 2002, Study 2



Classification Responses

Norenzayan et al, *Cog Sci*, 2002, Study 2

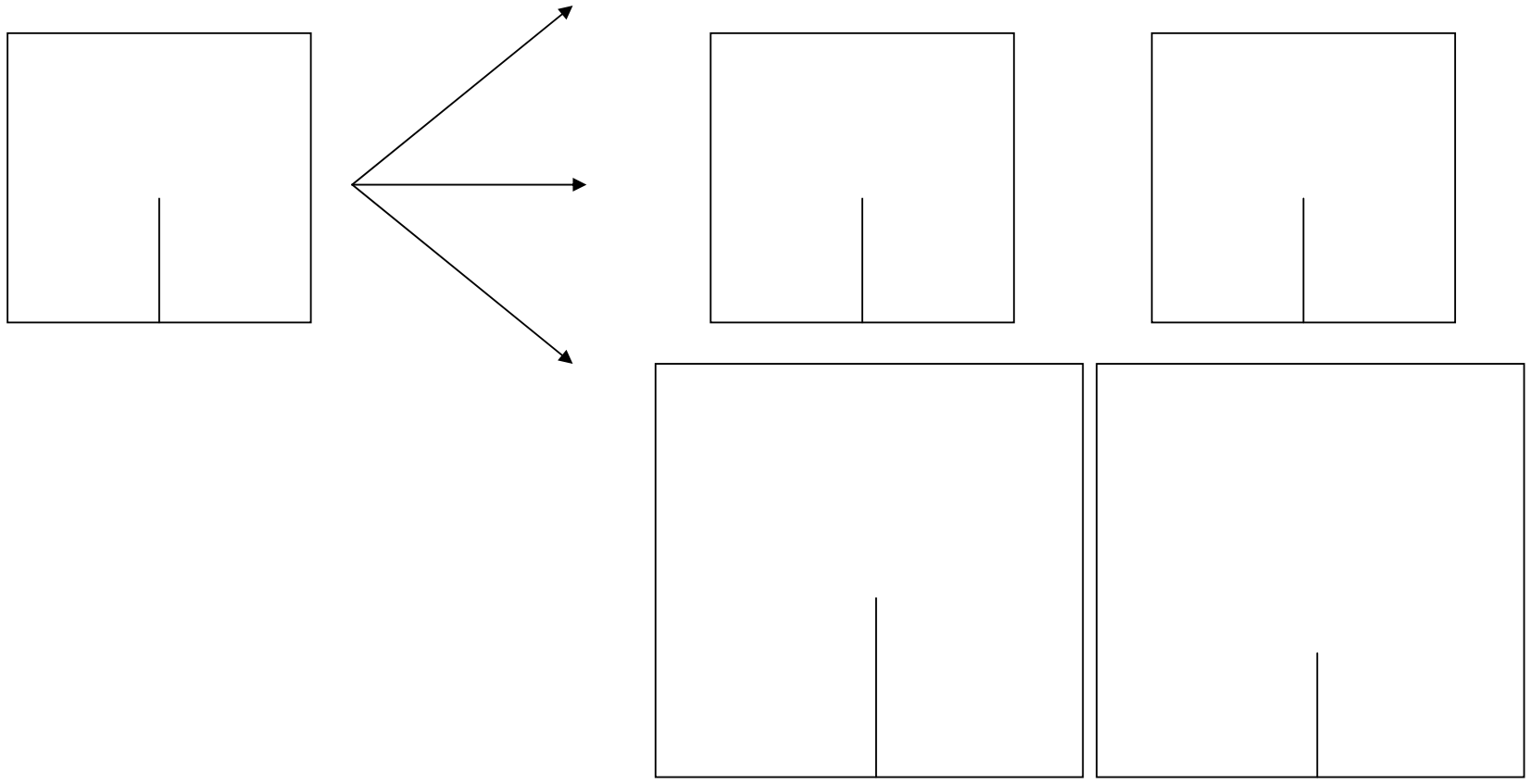


Framed Line Task:

Relative Task

Absolute Task

Target Stimulus

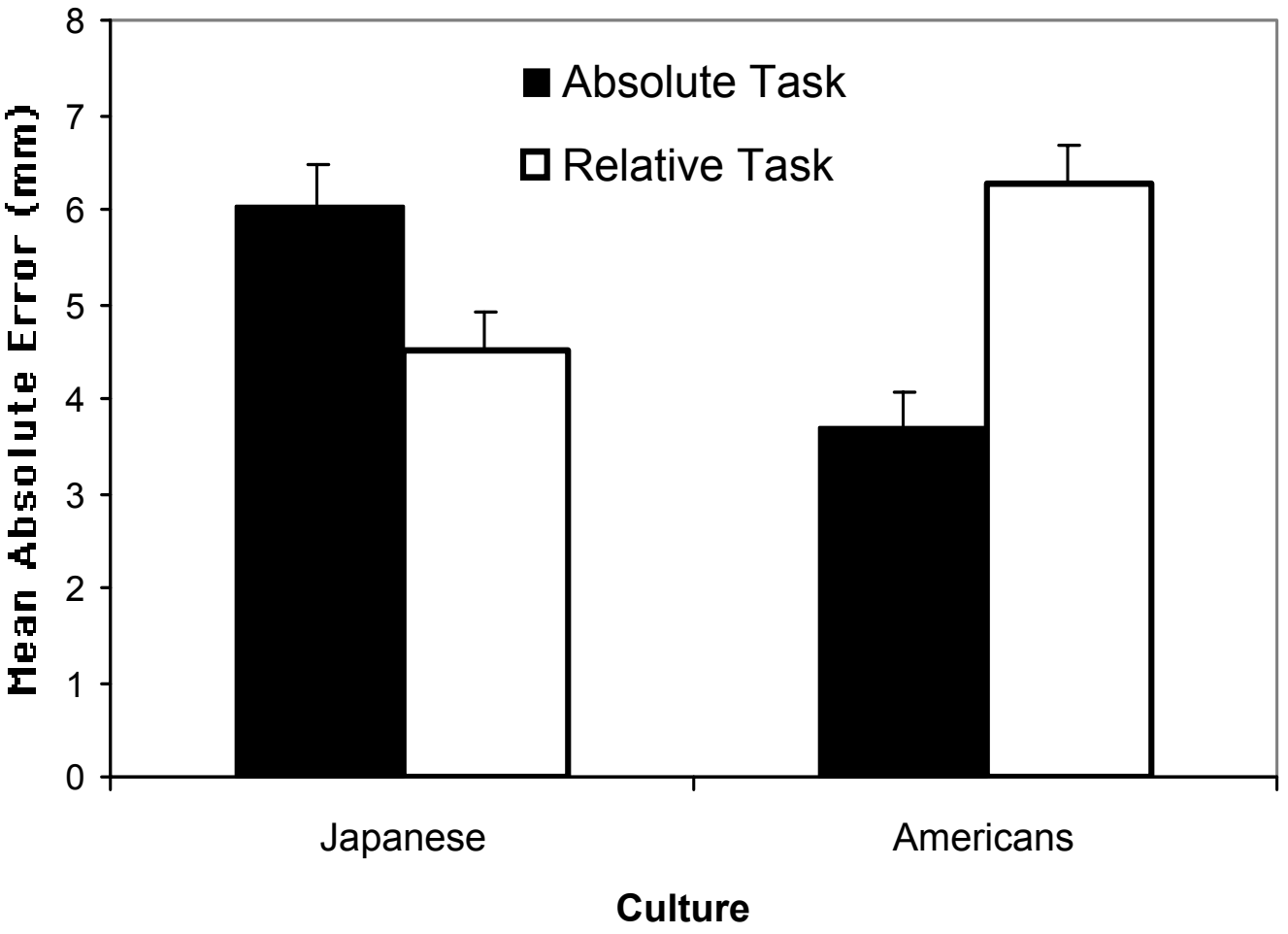


Framed Line Task:

Kitayama, Duffy, Kawamura, & Larsen, (2004)

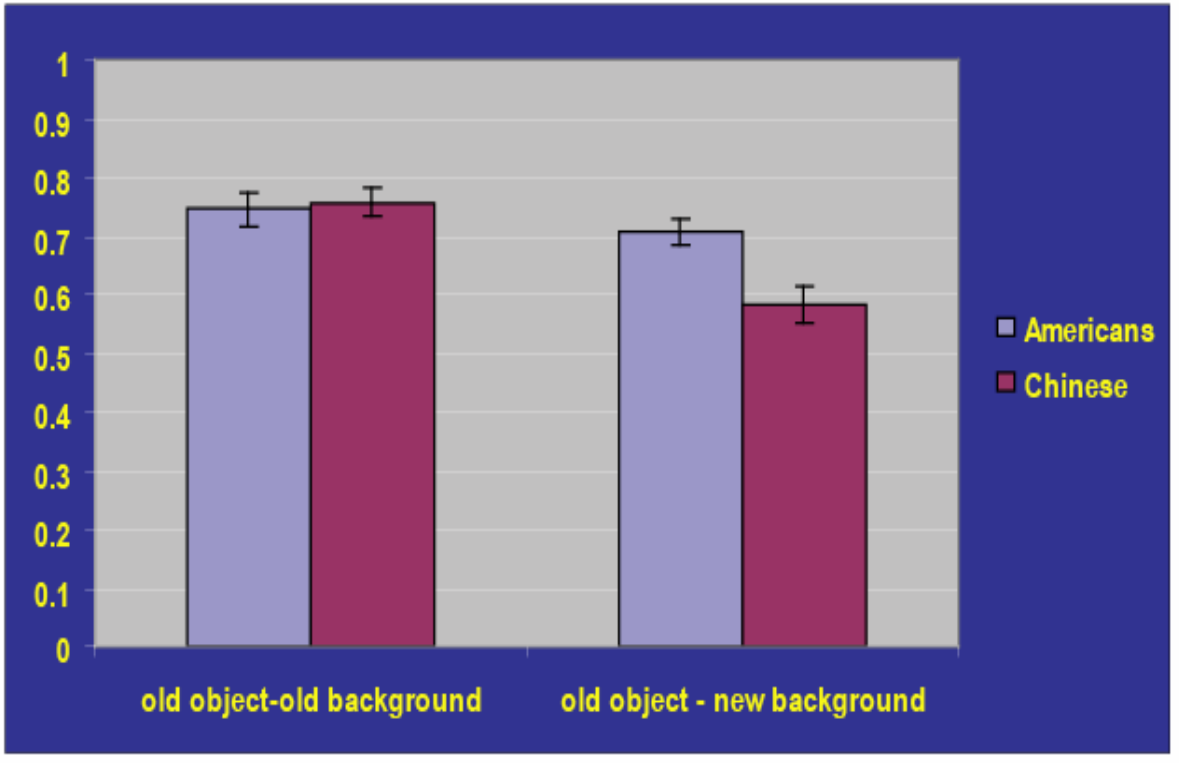
- Subjects see line in square frame
- Frame is removed and Ss are shown a different frame that is either larger, smaller or equal in size to the first frame
- Two within-subjects conditions
  - Relative task: Participants draw a line in the new frame that has the same proportion as the original
  - Absolute task: Participants draw a line in the new frame that has the same absolute length as the original

Results: Experiment 1

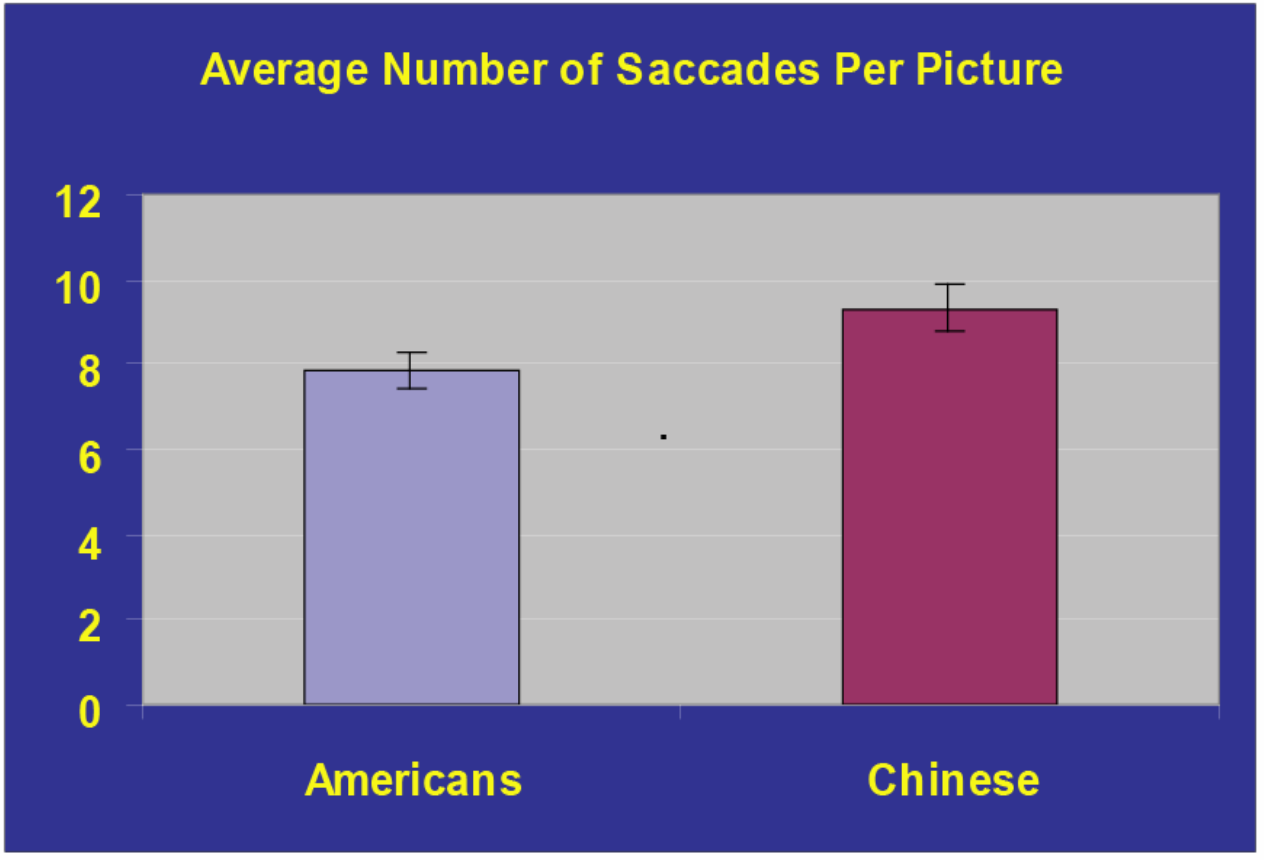


Eyetracking (Chua and Nisbett, 2005)
Study Phase

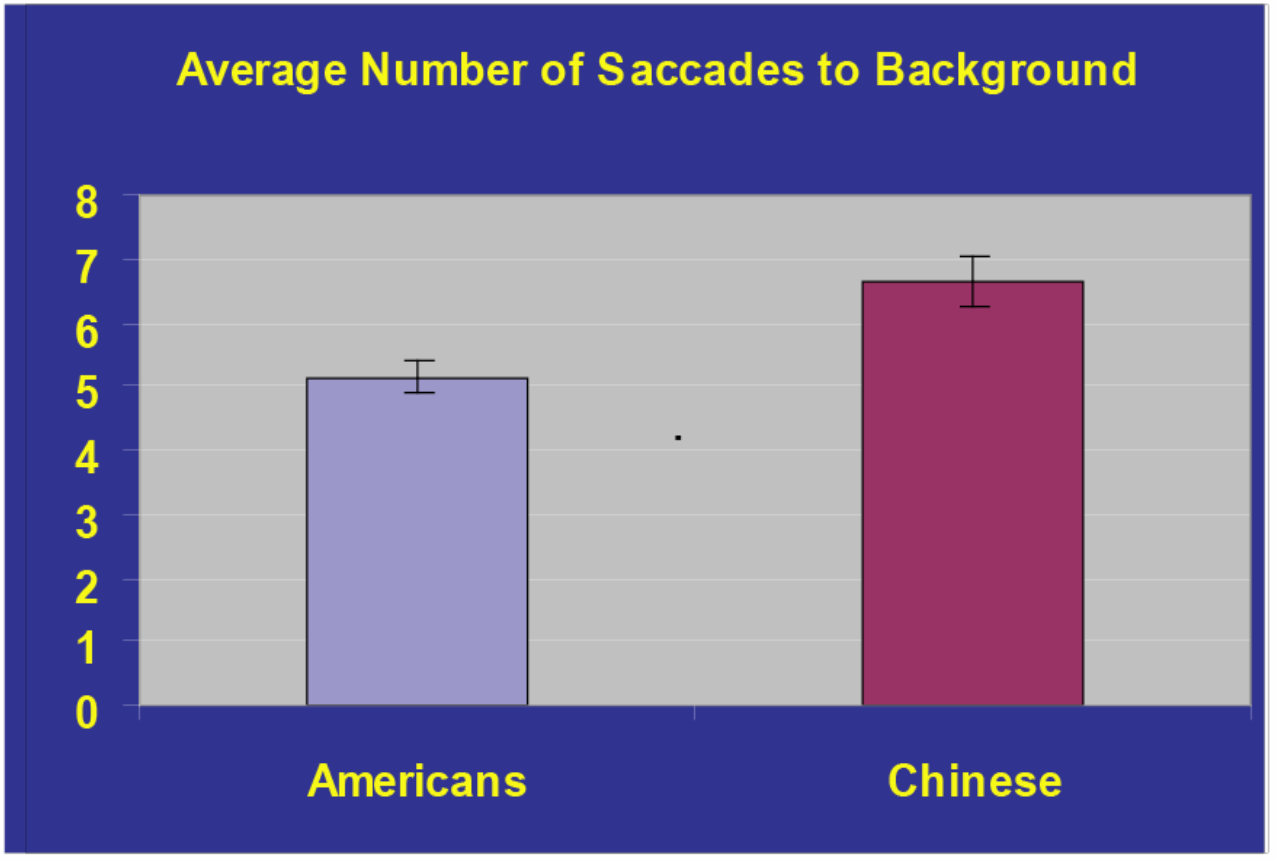
Chinese have poorer memory for old objects in new backgrounds p = .03)



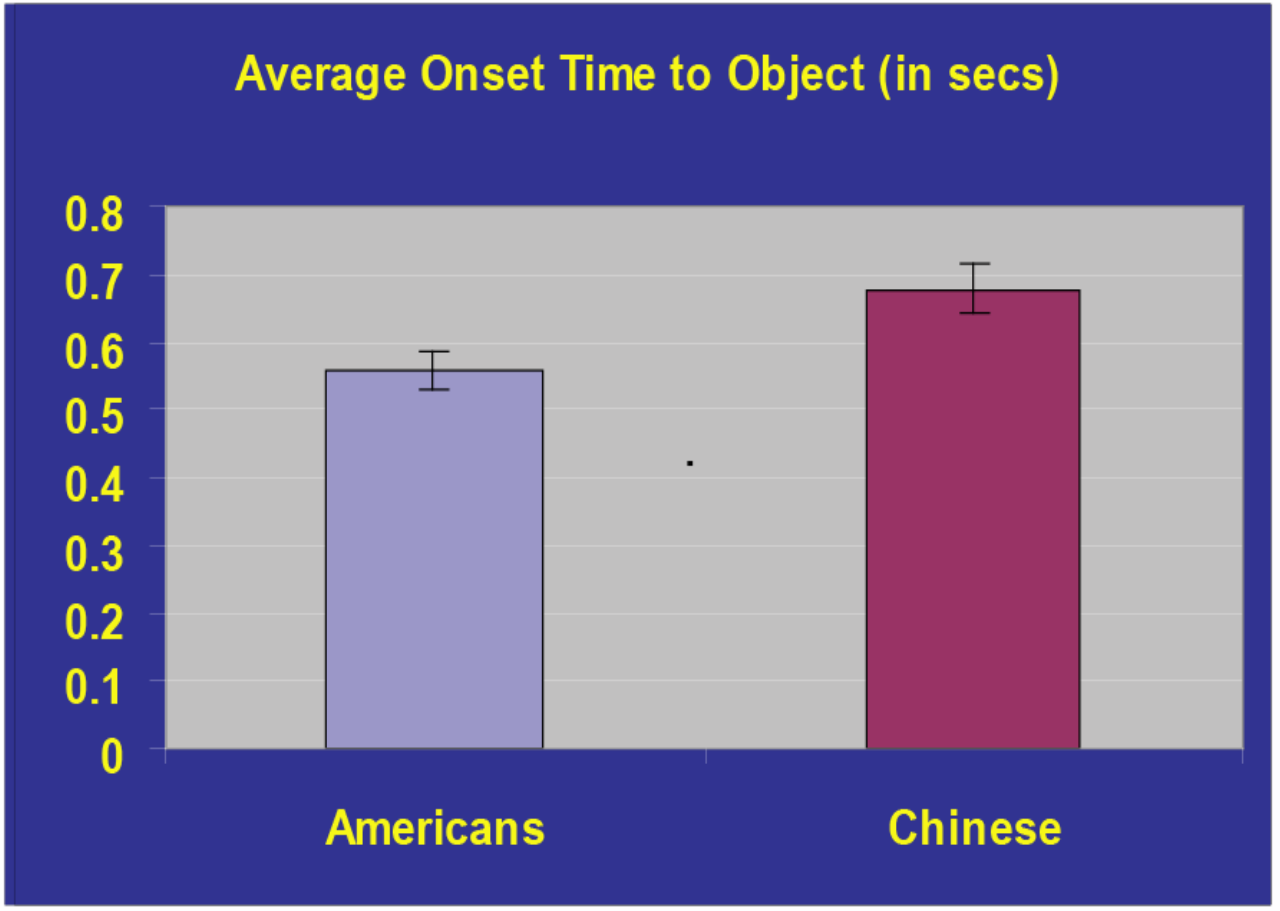
Chinese made more saccades to each picture presentation than Americans ($p < .05$).



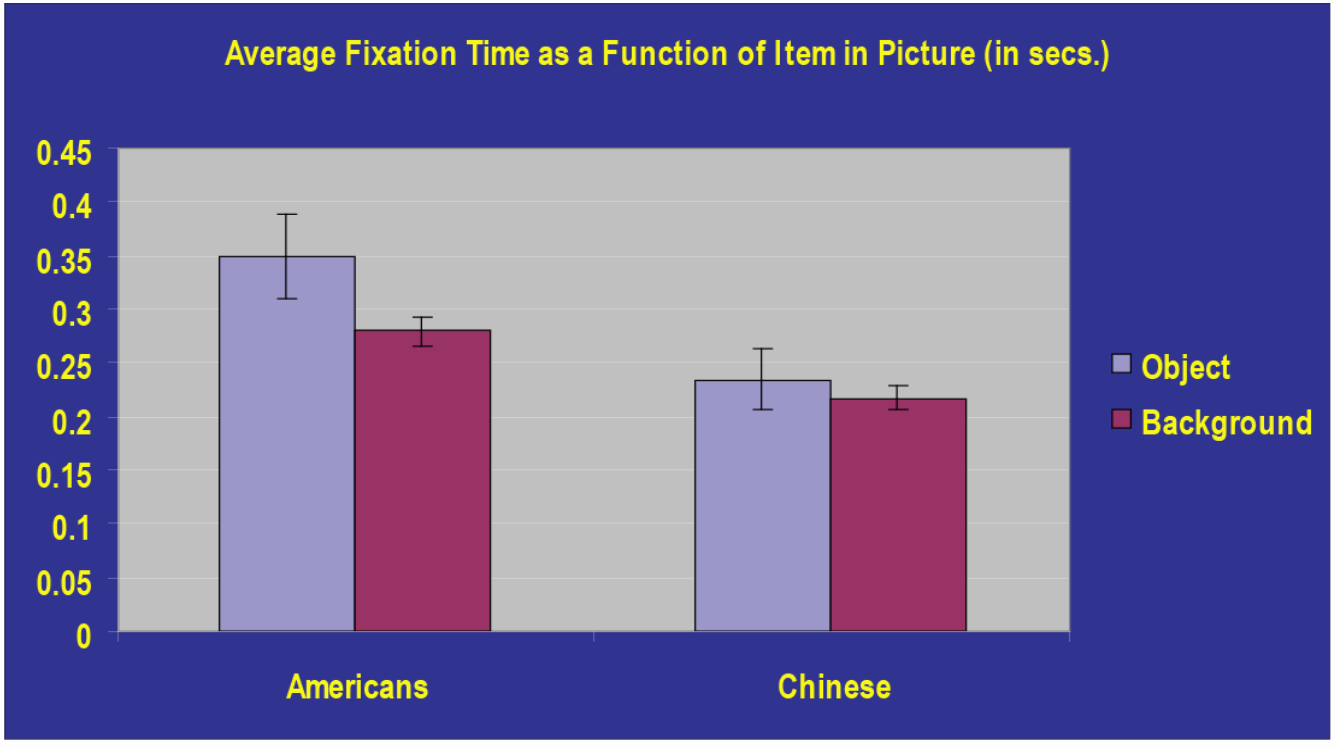
Chinese made more saccades to background than Americans (p = .003). No diff. in number of saccades to the object.



Americans look at the object sooner than Chinese (p = .02).



Americans have longer fixations than Chinese (p = .01). Compared to Chinese, Americans also have substantially longer fixations on objects than on backgrounds (p = .02).



Meta-Analysis
(Miyamoto et al, 2006)

- Cognitive differences between East Asians and Westerners
- Average d = .60
- Differences as large for perceptual tasks as for conceptual tasks
- As expected differences larger for EA living in EA than those tested in North America

Some Alternatives

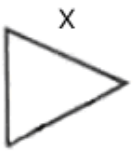
- Task Demands
  - No diffs in control conditions with same demands
  - Consistent across different degrees of task demands
- Sampling biases
  - Diffs controlling for demographic variables
  - Diffs whether or not students are sampled
- Language
  - Differences even when tested in English (but often reduced)
  - Differences even in minimally-linguistic tasks

Evidence from Other Cultures

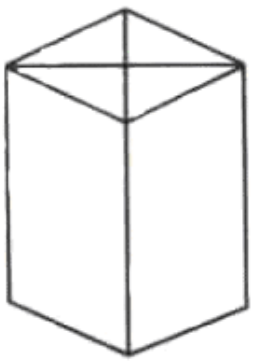
- Arabs
- Mapuche farmers in Chile
- Eastern vs. Western Europeans
- Southern vs. Northern Italians
- Southern vs. Northern Japanese

Group Embedded Figures Test

Here is a simple form which we have labeled "X":



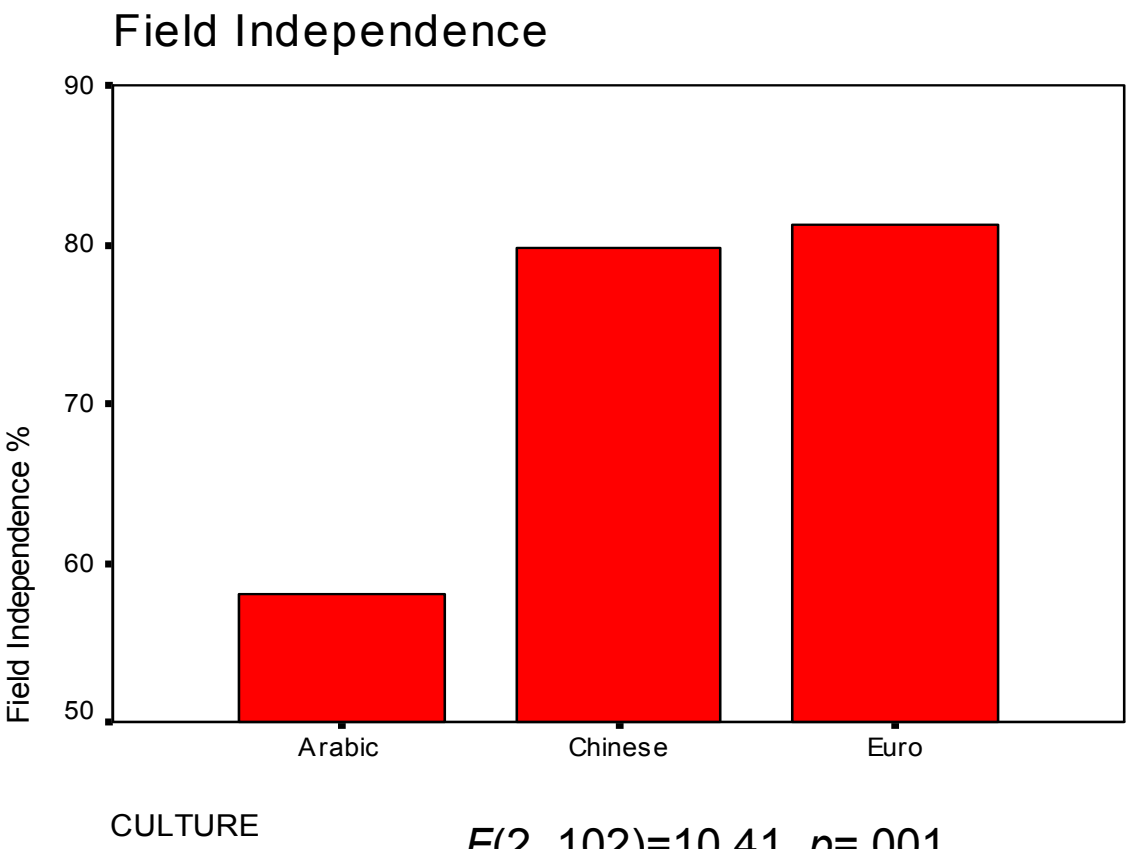
This simple form, named "X", is hidden within the more complex figure below:



Belief Bias: Design

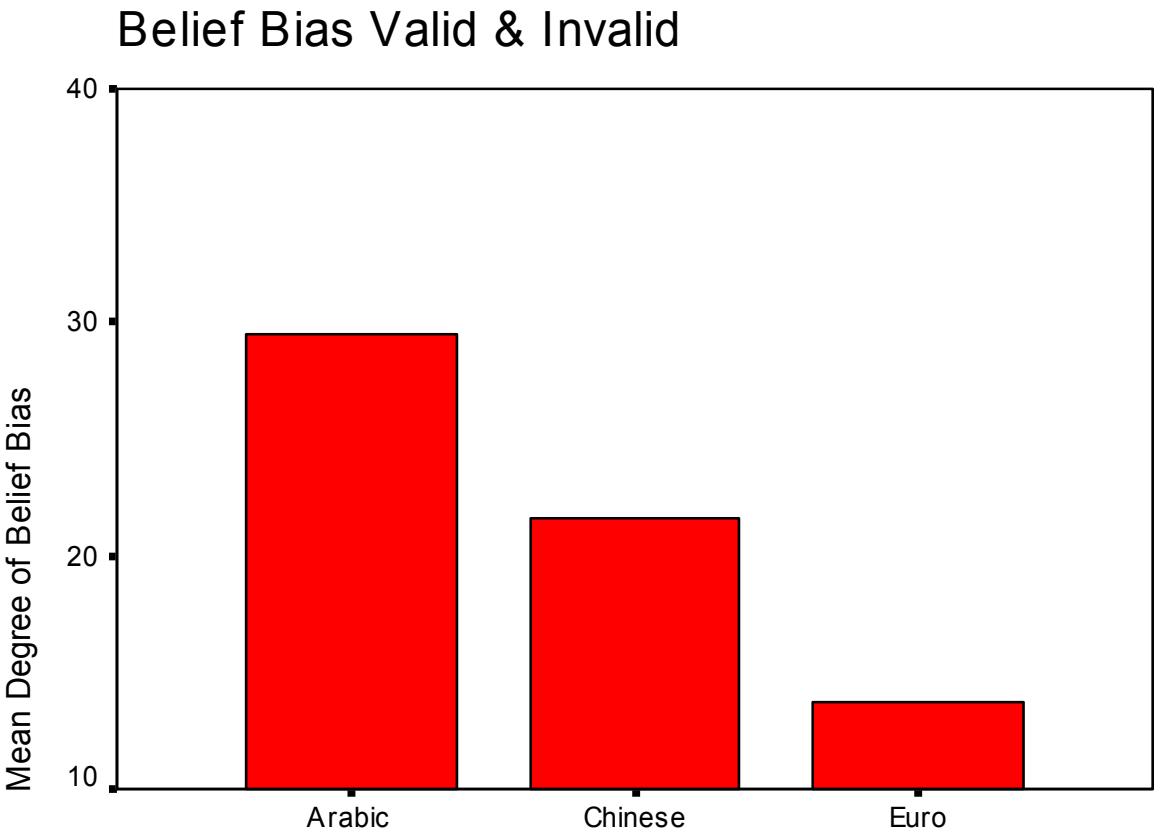
Belief	Logic: Valid	Logic: Invalid
Believable	Valid/ Believable	Invalid/ Believable
Nonbelievable	Valid/ Nonbelievable	Invalid/ Nonbelievable

Group Embedded Figures Test



F(2, 102)=10.41, *p*=.001

Controlling for religiosity didn't alter results



$F(2, 113)=4.47$, $p=.01$

Controlling for religiosity didn't alter results


Mapucheland


A
Corbis.com

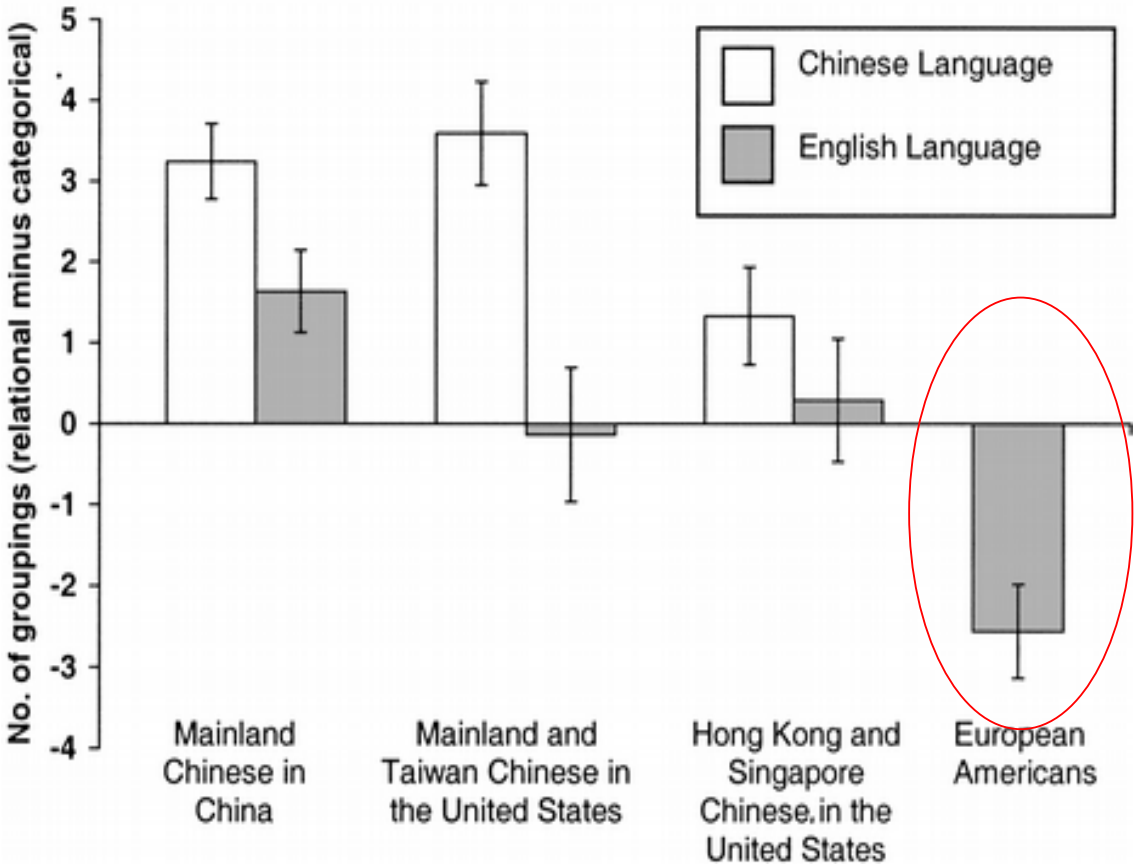

B


T
Corbis.com

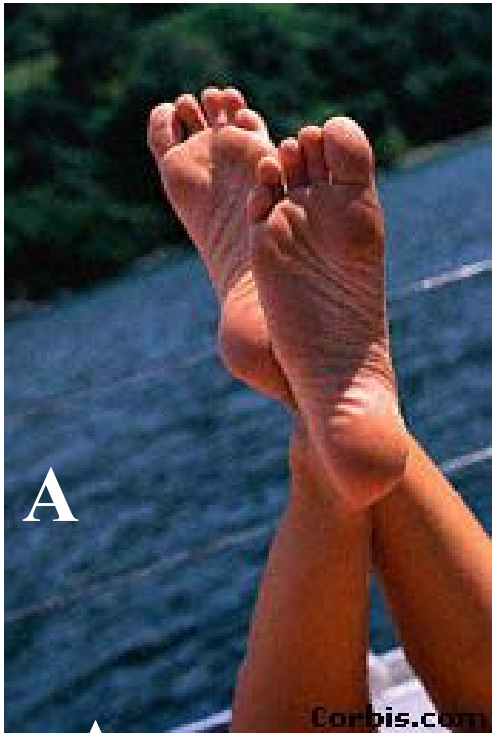
Mapuche Study (Henrich)

- N = 23, 18 men, 5 women
- Mean age = 50, range 26-80
- Mean education in years = 5.7, range 0-12
- Classification task: relational vs. categorical (feature based)
- Westerners reliably biased towards category-based classification

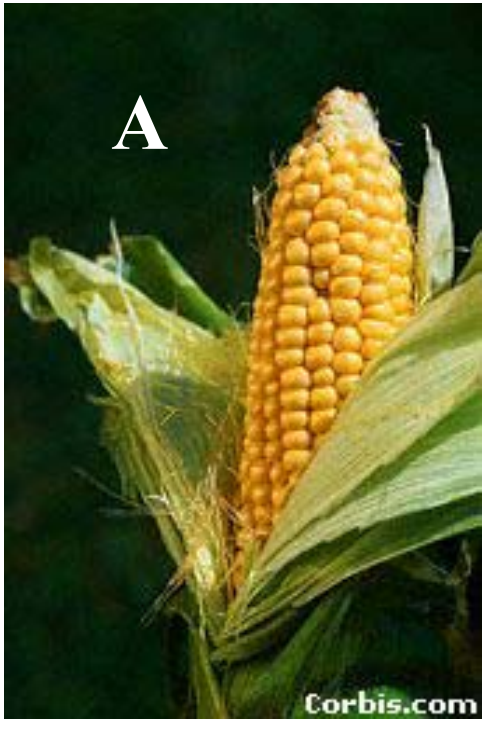
Ji, Zhang & Nisbett, *JPSP* 2004



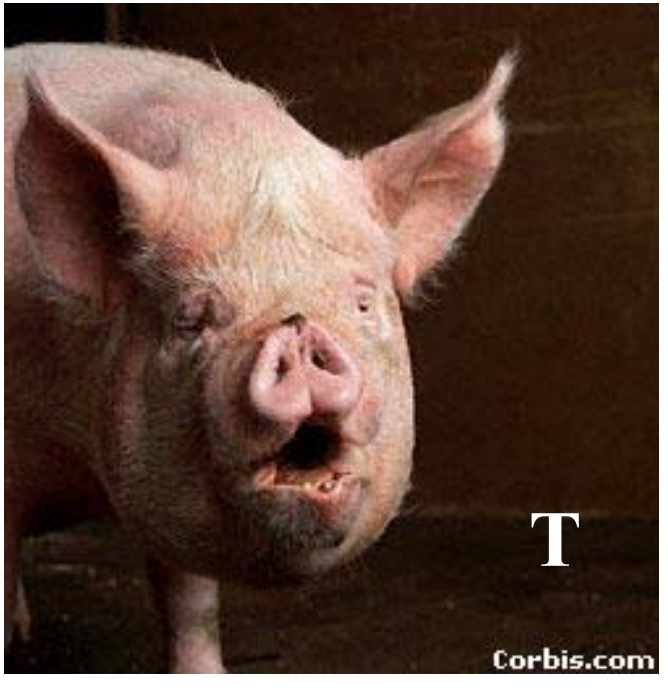
87%

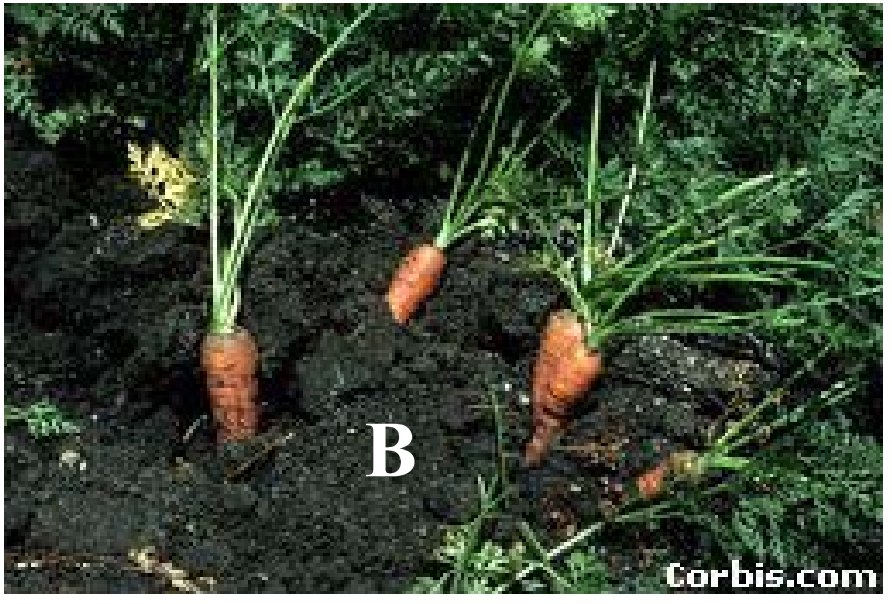


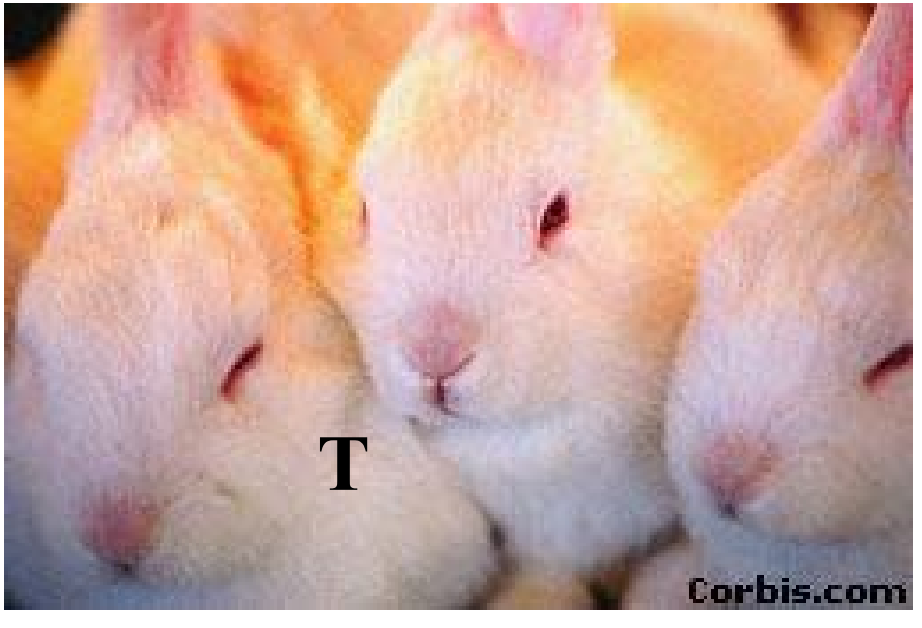
83%



91%

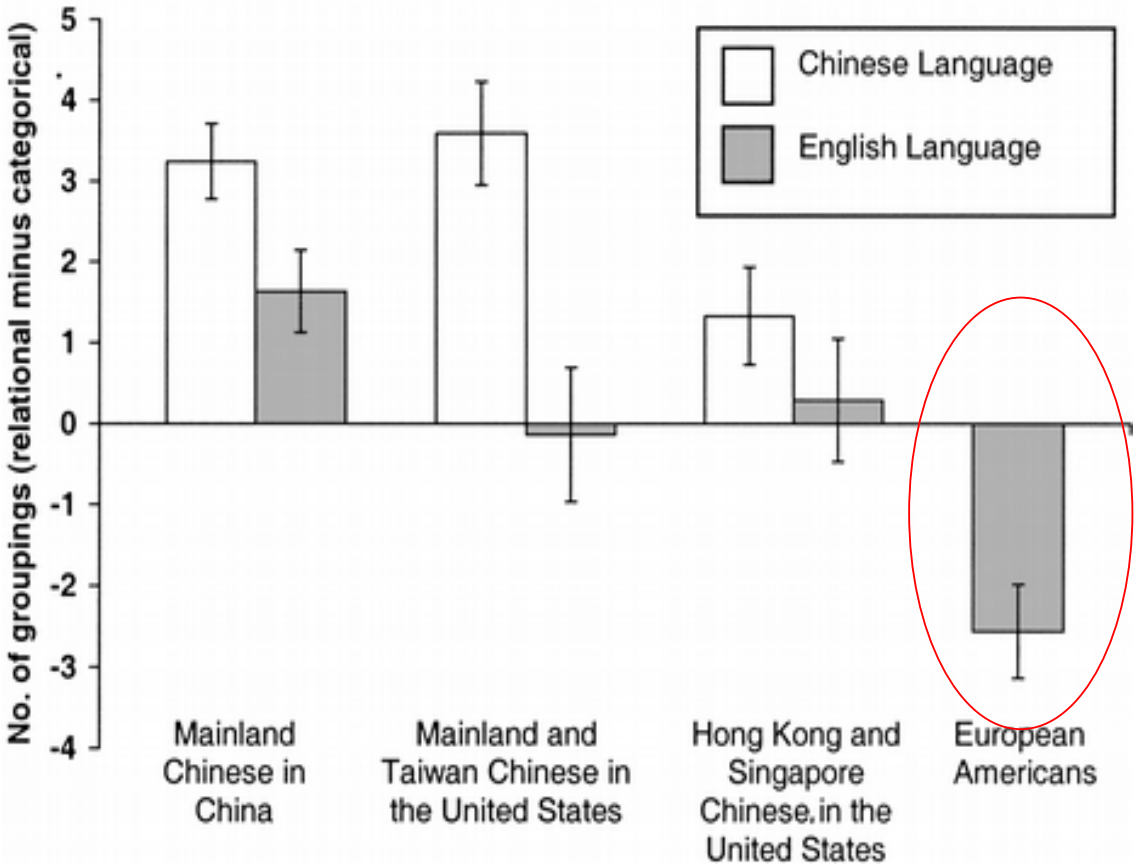






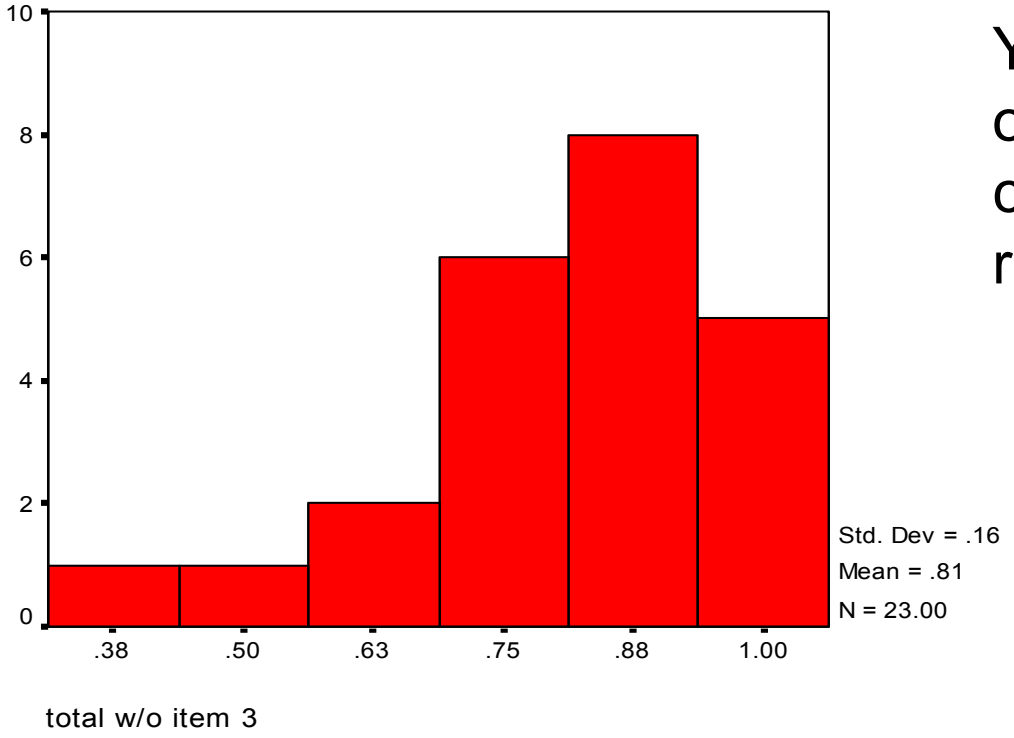
91%

Ji, Zhang & Nisbett, *JPSP* 2004



Overall Mapuche Results

- Mean of relational = 81%, SD = 16%



Years of education only predictor of classification, r=.40, p=.05

Other Cultures

- Eastern Europeans more relational than Western Europeans (Knight et al)
- Southern Italian HS students (Naples) more relational than Northern Italians (Milan) (Knight et al)
- Russians and Malaysians more field dependent than Americans and Germans (Kuhnen et al, 2001
- Southern Japanese (Hokkaido) more holistic in causal explanation than Northern Japanese (Kyoto) (Kitayama et al 2006)

Cultural Distribution of Analytic Reasoning

- East-West or West vs. the Rest?
- Or uniqueness of Post-Enlightenment Modern West?

Mechanisms

What mechanisms mediate the cultural difference?

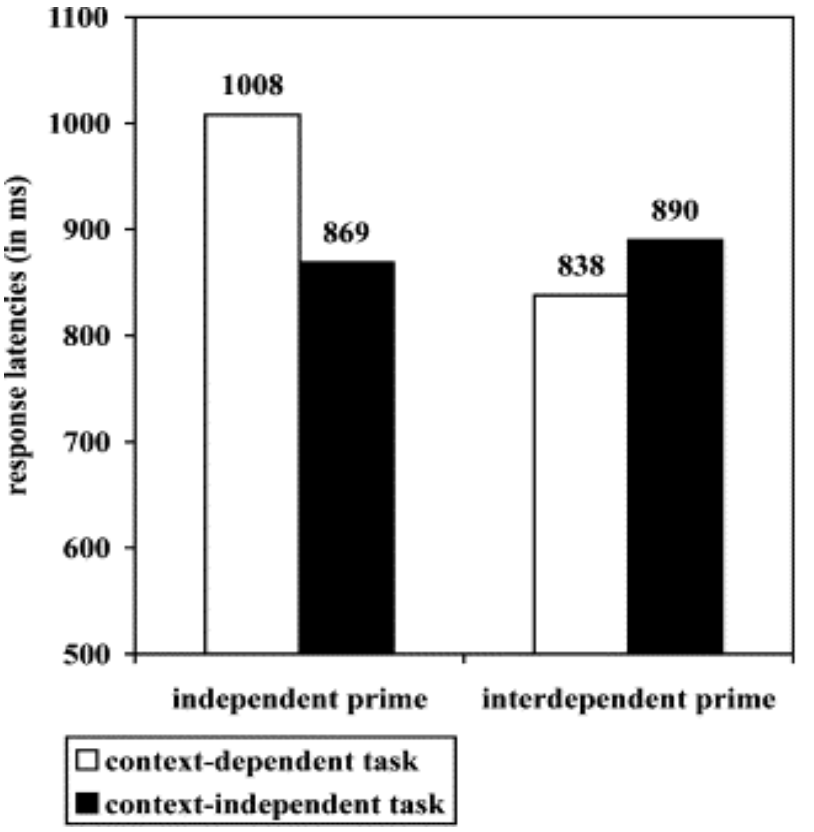
- Independence-interdependence
- Education: oriental medicine, western formal education
- Visual affordances of environment

Priming Self-Construal

Kuhnen & Oyserman, 2002, *JESP*

Independent:
I, ME, MINE

Interdependent:
US, OUR, WE



1
H

2
F

Perceptual Affordances

(Miyamoto, Nisbett, & Masuda, 2006, *Psych Science*)

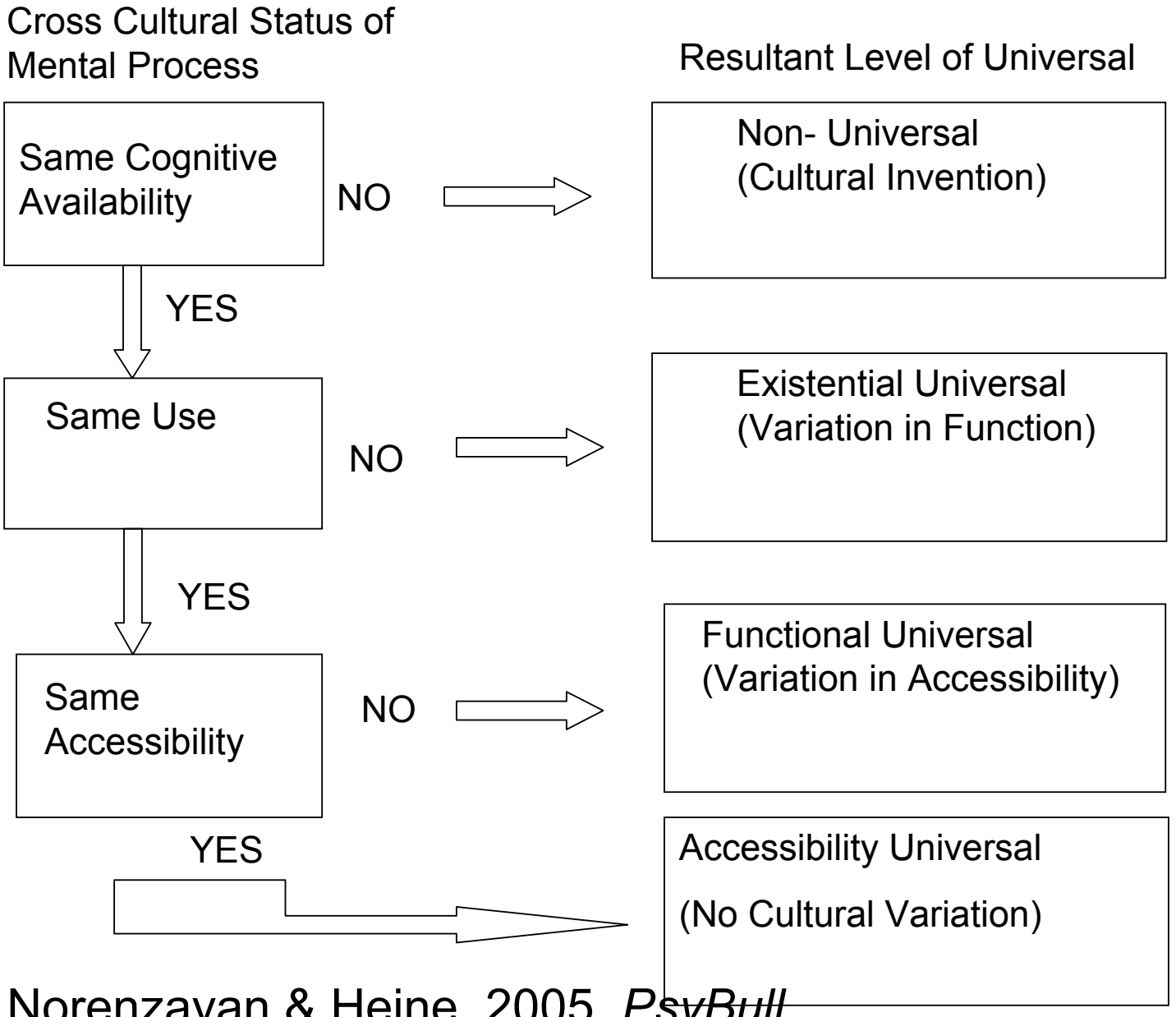
- Japanese scenes, compared to American ones, are more complex
  - Have more objects
  - Have more interpenetrating objects
- Americans incidentally primed with Japanese scenes become more holistic in unrelated task

Educational Practices

- Western style formal education best predictor of analytical solutions (Scribner, 1977)
- Training in Oriental Medicine increases holistic responses among Korean students (Koo & Choi, 2005)

Conclusions

- Dual process models critical for cross cultural comparisons
- Two reasoning systems exist in principle in the cognitive repertoire of all cultures (*Existential Universal*)
- But cultures differ in reliance and accessibility (*Variability in accessibility and function*)



Norenzayan & Heine, 2005, *PsyBull*