



Accuracy and Efficiency: Behavioral measures of people's semantic interpretations of four types of visual information

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Purpose | Objective of Study

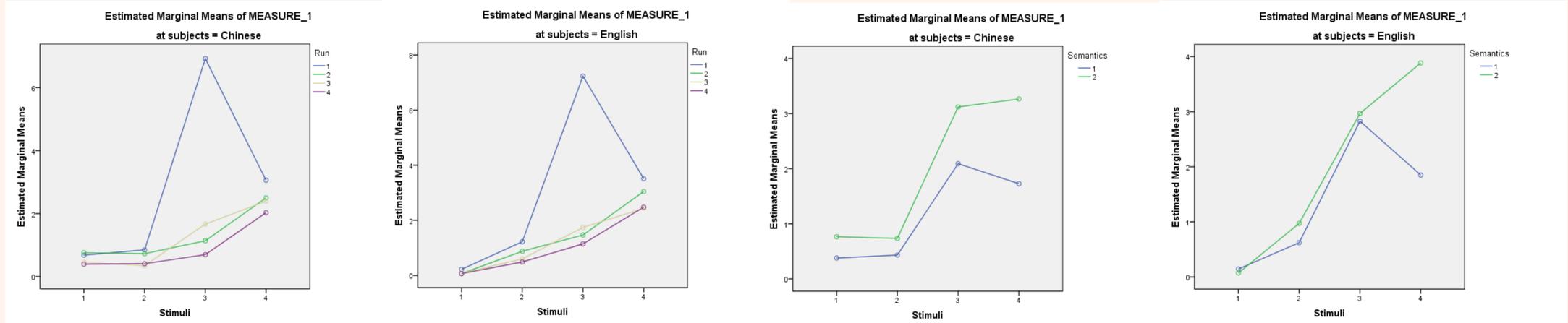
The purpose of this study is to investigate how fast people can correctly interpret icons, pictures, English words and Chinese characters in a behavioral task.



Two objectives of this study are:

1. To examine how people behaviorally respond to these four types of visual information in terms of error and reaction time.
2. To establish the behavioral model and to select proper test participants for the follow-up fMRI study.

Key Findings about People's Accuracy in Interpreting Visual Information



Stimuli: 1= Chinese characters; 2= English words; 3= Icons; 4= Pictures. Semantic s: 1= Concrete; 2= Abstract.

- People made significantly more errors in the 1st run especially with icons ($F(2.345)=309.947, p<.01$; $F(4.875)=211.043, p<.01$).
- Once the meanings of icons are learned, they are less ambiguous than pictures but are not as stable as texts ($F(2.106)=201.098, p<.01$).
- People made significantly more errors with abstract stimuli ($F(1)=26.653, p<.01$), which suggested that abstract stimuli were generally harder to learn.

Experimental Design

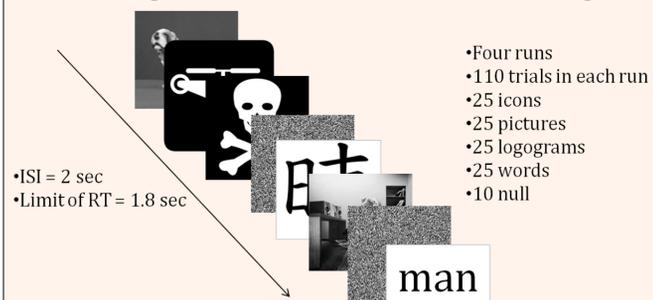
Within-Subject Factors:

Factor 1	Icons		Logograms		Words		Pictures													
Factor 2	Concrete	Abstract	Concrete	Abstract	Concrete	Abstract	Concrete	Abstract												
Factor 3	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Between-Subject Factors:

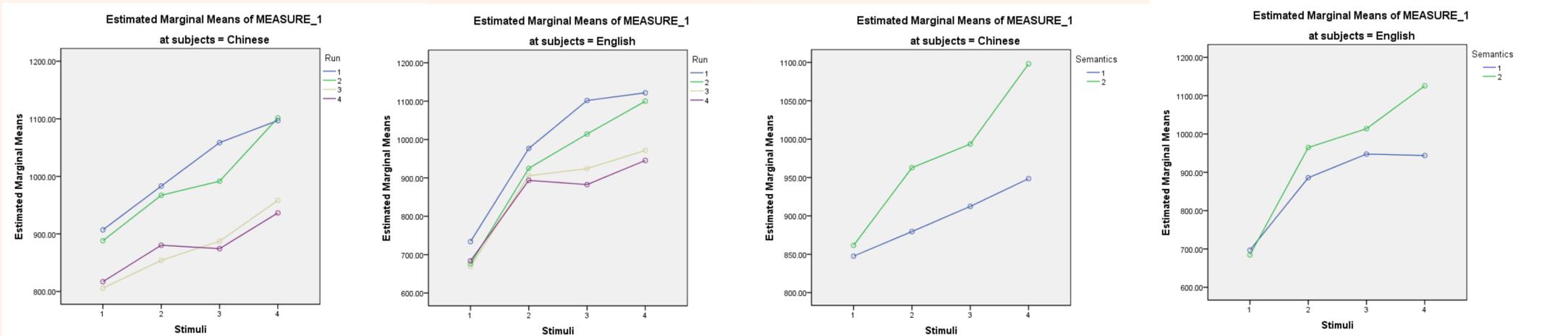
English speakers (n=45) and Chinese Speakers (n=33)

Presenting Stimuli as Event-related fMRI Paradigm



The task requires test participants to push one of the two buttons (concrete/abstract) to respond to the presented stimulus for semantic judgment. Numbers of errors and reaction times in milliseconds are recorded as dependent measures.

Key Findings about People's Efficiency in Interpreting Visual Information



Stimuli: 1= Chinese characters; 2= English words; 3= Icons; 4= Pictures. Semantic s: 1= Concrete; 2= Abstract.

- People are significantly slower in the 1st run and reach their max speed in the 3rd and 4th run ($F(2.094)=145.838, p<.01$).
- Time spent in pictures > icons > words > logograms ($F(2.613)=344.412, p<.01$).
- People needed significantly more time to correctly interpret abstract stimuli ($F(1)=77.784, p<.01$).