Online Measurement of Conceptual Distance via the Implicit Association Test

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Event Structure Metaphor

A cluster of related conceptual metaphors (Lakoff 1993):

A. STATES ARE LOCATIONS / STATES ARE OBJECTS
B. CHANGES ARE MOVEMENTS
C. CAUSES ARE FORCES
D. ACTION IS SELF-PROPELLED MOTION
E. PURPOSES ARE DESTINATIONS
F. MEANS (OF CHANGE OF STATE/ACTION) ARE PATHS (TO DESTINATIONS)
G. DIFFICULTIES ARE IMPEDIMENTS TO MOTION
H. EXPECTED PROGRESS IS A TRAVEL SCHEDULE
I. EXTERNAL EVENTS ARE LARGE, MOVING OBJECTS
J. LONG-TERM, PURPOSEFUL ACTIVITIES ARE JOURNEYS

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C. CAUSES ARE FORCES

D. ACTION IS SELF-PROPELLED MOTION **<< Ego-Centric Motion**

E. PURPOSES ARE DESTINATIONS **<< Ego-Centric**

F. MEANS (OF CHANGE OF STATE/ACTION) ARE PATHS (TO DESTINATIONS)

G. DIFFICULTIES ARE IMPEDIMENTS TO MOTION **<< Ego-Centric**

H. EXPECTED PROGRESS IS A TRAVEL SCHEDULE **<< Ego-Centric**

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J. LONG-TERM, PURPOSEFUL ACTIVITIES ARE JOURNEYS **<< E-C**

Relative Motion

and the TIME IS SPACE Metaphor (Gentner, Imai & Boroditsky 2002)

✳ Ego-Moving Metaphor

"The war is <u>behind</u> us."
"His whole future is <u>before</u> him."

✳ Time-Moving Metaphor

"I will see you <u>before</u> four o'clock."
"The reception will <u>come after</u> the talk."

Relative Motion

and the STATES ARE LOCATIONS / OBJECTS event structure metaphor

✳ Moving-Ego (Quest), English

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and _the pursuit of Happiness_."

✳ Stationary-Ego, English

"Lord grant me the serenity _to accept the things I cannot change_, the courage to change the things I can, and the wisdom to know the difference."

Relative Motion

✳ ## Moving-Ego (Quest), Mandarin

其实、这么久以来，很多人都<u>在追求幸福</u>，包括我在内！
Qishi   zheme jiu   yilai,   hen-duo   ren   dou <u>zai-zhui-qiu</u>
Actually, so   long   since, DEG-many people   all <u>PROG-pursue-strive.for</u>

<u>*xingfu*</u>,   *baokuo wo   zai-nei!*
<u>happiness</u>,   include   1.Sg at-inside!

"Actually, everyone has been <u>*seeking happiness*</u> for a long time, and me too!"

✳ ## Stationary-Ego, Mandarin

要讓孩子從小就<u>感受到幸福</u>
Yao   rang   haizi   cong-xiao jiu   <u>gan-shou-dao   xingfu</u>
want let   child   from-little already <u>moved-accept-arrive   happiness</u>

"[Do you want to] let your children <u>*feel happy*</u> while they're still young?"
     (lit. "… <u>*accept the arrival of happiness*</u> …")

Relative Motion

English Event structure metaphors for happiness in the BNC

Metaphor Type	Related Source Domains	Freq.
Quest/Moving-Ego	Object, Possession, Location, Goal, Obstacle, Control, Conflict, Force, Value	153
Stationary-Ego	Object, Location, Possession	22
Other	Object, Possession, Transfer, Landmark, Location, Force, Organism, Fragility	52
	Total	**227**

Mandarin Event structure metaphors for happiness in the Sinica Corpus

Metaphor Type	Related Source Domains	Freq.
Stationary-Ego	Object, Transfer, Value, Height, Possession, Location, Substance, Authority, Transfer, Sustenance, Quest	72
Quest/Moving-Ego	Object, Location, Goal, Fullness, Possession	34
Other	Object, Possession, Transfer, Movement, Location, Quantity, Goal	58
	Total	**164**

Relative Motion

English Constructions

Cxn	Freq. with *happiness*	Freq. of cxn overall	Distinctiveness (p-log10 value)
pursuit of ~	17	1,201	43.41
greatest ~	18	5,049	35.13
glow with ~	10	177	31.92
bring ~	24	42,560	27.59
source of ~	12	6,675	20.12
find ~ with X	10	2,760	19.91
filled with ~	9	1,878	19.07
great ~	18	43,121	18.62
~ in life	7	1,428	15.04
~ in marriage	5	229	14.16
find ~	19	96,554	13.75
spread ~	8	4,441	13.64
quest for ~	5	421	12.83
maximize ~	4	236	10.99

Chinese Constructions

Cxn	Freq. with *xingfu*	Freq. of cxn overall	Distinctiveness (p-log10 value)
~ mei-man	17	99	52.27
zhui-qiu ~	15	1,250	28.38
duo-me ~	10	523	21.17
gan-dao ~	11	1,656	18.17
dai-lai ~	10	1,269	17.32
de-dao ~	11	2,310	16.60
jue-de ~	13	6,354	14.81
guo-de ~	5	203	11.43
huo-de ~	7	2,488	9.22
yong-yuan ~	6	1,341	9.17
yong-you ~	6	2,135	7.98
mou ~	3	85	7.53
mei-man ~	3	99	7.33
~ mo-guo-yu X	3	113	7.15

See Stefanowitsch & Gries (2005: 7) regarding calculation of distinctiveness for constructions.

Relative Motion

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Chinese Cxns (Sinica Balanced)

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Moving-Ego/Quest Perspective

Stationary-Ego Perspective

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Research Questions

- Is the conceptual dual for relative motion realized not only in language but also in our conceptual systems?

- In other words, do the ways we talk about happiness reflect the ways in which we conceptualize happiness?

- Hypotheses:

    English Ss associate happiness with moving-ego events ("seeking")

    Chinese Ss associate it with stationary-ego events ("receiving")

IAT: Method

Implicit Association Test (IAT, Greenwald et al. 1998)

1. Categorize priming stimuli [seeking/receiving]

2. Categorize target stimuli [happiness/sadness]

3. Initial combined block

4. Reversed target stimuli

5. Reversed combined block
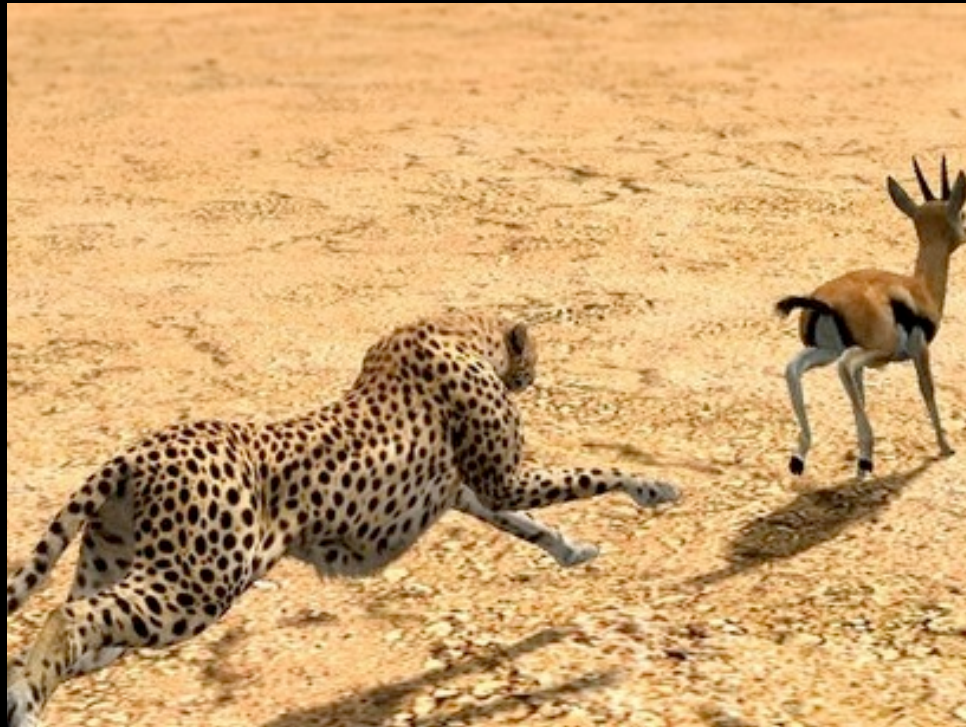
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Blocks 3 & 5 are experimental tasks

Blocks 1, 2 & 4 are for training only

IAT: Method

Subjects:

16 English monolinguals (3m / 13f)

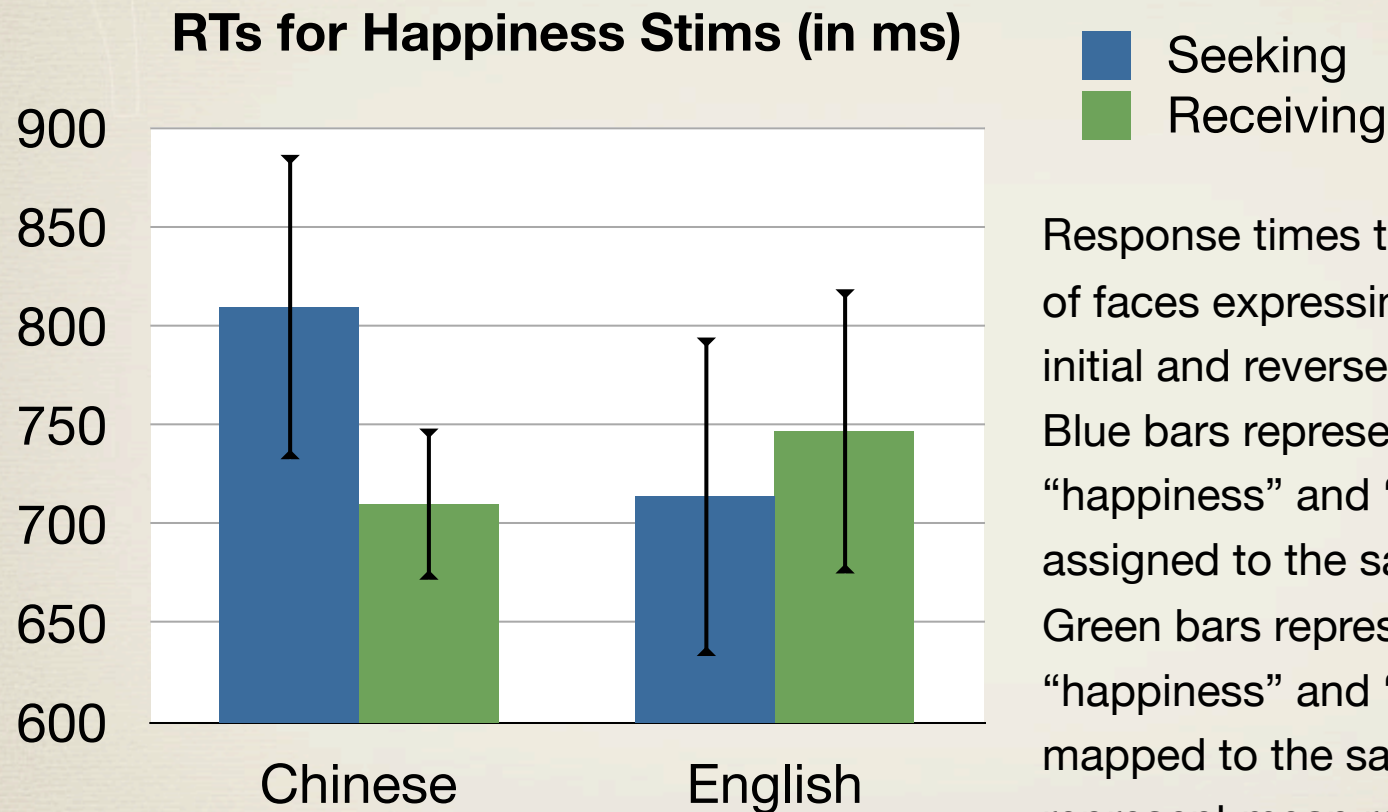16 Chinese bilinguals (4m / 12f, avg. 10.5 yrs in English-speaking country)

Materials:

16 Images of events (8 seeking vs. 8 receiving)

16 Images of facial expressions (8 happiness vs. 8 sadness)

Prediction:

	Response Key Mapping	
	Happiness + Seeking	Happiness + Receiving
Chinese Subjects	Slower	Faster
English Subjects	Faster	Slower

IAT: Results

RTs for Happiness Stims (in ms)

Legend: Seeking (blue), Receiving (green)

Interaction Effect (Mapping x Language)
by subject F(1,15) = 5.04, p = 0.04, partial eta sq. = 0.252
by item F(1,7) = 24.713, p = 0.002, partial eta sq. = 0.779

Response times to categorize images of faces expressing happiness in initial and reversed combined blocks. Blue bars represent trials where "happiness" and "seeking" were assigned to the same response key. Green bars represent trials where "happiness" and "receiving" were mapped to the same key. Values represent mean response time in milliseconds; error bars indicate 95% confidence intervals.

IAT: Results

Seeking (blue)
Receiving (green)

Interaction Effect:

by subject Mapping*Lang F(1,15) = 7.91, p = 0.026, partial eta sq. = 0.531

by item Mapping*Lang F(1,7) = 1.948, p = 0.183, partial eta sq. = 0.258

Besides the Mapping/Language interaction found in the subjects analysis, all other significant effects relate to block (main effect of block by subjects, F(1,15) = 37.248, p < 0.001, partial eta sq. = 0.842). Subjects were more accurate overall in block E versus block C, as should be expected.

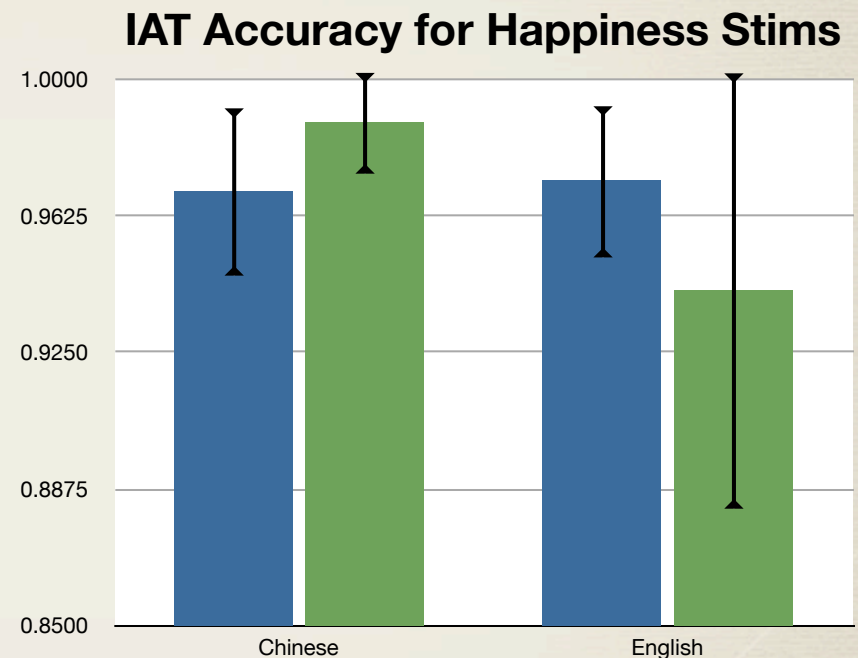**IAT Accuracy for Happiness Stims**

Figure above: Accuracy rates when categorizing images of faces expressing happiness. Blue bars represent trials where "happiness" and "seeking" were assigned to the same response key. Green bars represent trials where "happiness" and "receiving" were mapped to the same key. Values represent mean accuracy as a percentage; error bars indicate 95% confidence intervals.

Discussion

Main findings

- English *happiness*: bias for Moving-Ego event structure metaphor

- Chinese *xingfu* 'happiness': bias for Stationary-Ego metaphor

- The Moving-/Stationary-Ego biases are reflected in non-linguistic categorization by English and Chinese speakers

- Our understanding of emotion is partially grounded in spatial cognition

Discussion

Directions for future research

- Replicate IAT with verbal interference (cf. Winawer et al. 2007: 7782)

- Diachronic approach

- Do other languages show similar types of variation concerning spatial perspectivization for event structure metaphors?

- Individual vs. collective happiness? (cf. literal language use)

- Does the Moving-/Stationary-Ego distinction involve embodied simulation of movement events?

Thank you!

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