



Are Word Senses Shared across English and Chinese?

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Background

Polysemy refers to the phenomenon that a word or phrase has multiple related meanings. For example, *head* in

- “*head* of the company”
- “*head* of the table”
- “*head* of the class”

has senses different from but related to the core sense of the upper part of an animal body, e.g., “*head* of chicken”.

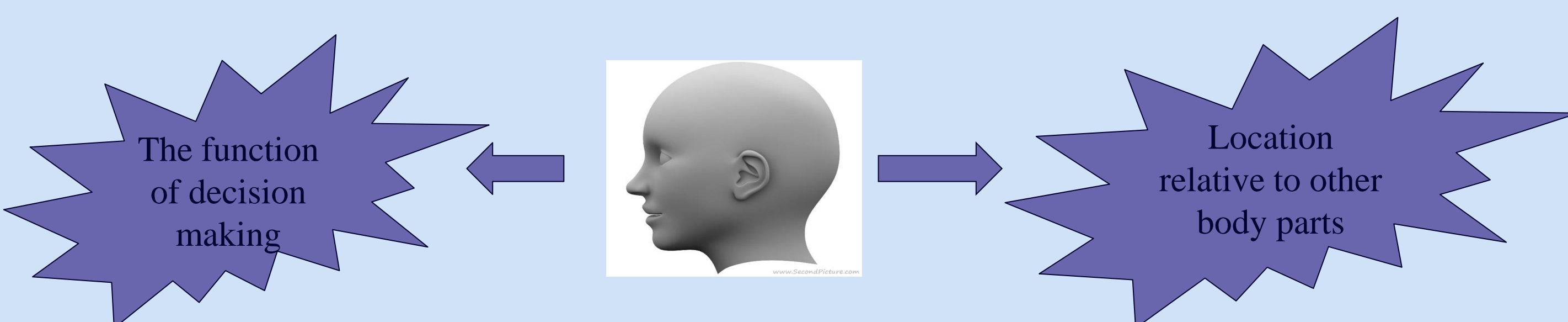
Many case studies of individual words have suggested that extended senses are generated from some central or core sense of the word. However, a general account of polysemy that applies across words, different word classes, and different languages, is needed.

Rationale and Approach

The current study was designed to explore language-independent cognitive foundations of polysemy.

Shared cognitive capabilities and some shared experiences - specifically, shared perception of salient properties of referents of the core sense --

➔ **shared polysemous senses in historically unrelated languages**



Questions & Prediction

Questions

- Can a set of words be identified for which there is cross-linguistic agreement on the core senses of the words in two independent languages?
- If so, to what extent are there shared polysemous senses?

Prediction

- Given shared core senses, if there is some common cognitive basis for extending word meanings, then we will see shared polysemous senses consistently appear across paired words.

Task 1: To examine between-language agreement on core senses

Materials. Thirty-six paired English (SUBTLEX-US, Brysbaert & New, 2009) and Chinese (SUBTLEX-CH, Cai & Brysbaert, 2010) words, 12 each of nouns, verbs and adjectives, were selected (Table 1).

For each word in each language, 30 sentences representing existing senses were selected by English-speaking and Chinese-speaking assistants from comparable monolingual dictionaries. For a word possessing n senses, the number of sentences representing each was approximately $30/n$. For each language, there were 36 envelopes, each for one word, each containing 30 paper slips with a sentence on each.

Participants. 10 native speakers for each language were recruited at Lehigh University.

Procedure. In each trial of the 36, participants selected ALL and ONLY sentences representing the core sense, defined as the most fundamental and basic sense.

Seven (or 70%) was used as the threshold for a majority and sentences receiving 7 or more votes were considered as representing the core sense for a word. Two English-Chinese bilinguals then judged the cross-linguistic agreement on the core senses independently. If the core sense of a word in one language was judged to agree with the paired word in the other language by both judges, the pair was considered to agree on the core sense.

Results. All core senses for the 36 pairs were judged to be shared by English and Chinese.

Task 2: To establish the different senses

Materials. Same as Task 1.

Participants. 20 different participants were recruited as in Task 1.

Procedure. In each trial of the 36, the participants sorted the 30 paper slips into as many different sense categories as desired.

The sorting data were subjected to clustering methods to identify the distinct senses. Two English-Chinese bilinguals then independently judged the shareability of the senses identified, with one judge starting from each language. The results were tallied into shared and non-shared senses. If sense # x in one language was judged to match sense # y in the other language by the two judges simultaneously, x and y were considered as shared. All others were considered non-shared.

Results. Almost all of the pairs (33 out of 36 or 91.67%) were judged to have shared polysemous senses. Core sense aside, the means of shared polysemous senses for English and Chinese were 1.47 (SD = 1.03) and 1.44 (SD=.94), respectively. This represents an average percentage of shared senses for English and Chinese of 55.83% and 55.85% across the 36 pairs, respectively. The numbers of shared senses for English and Chinese words was significantly different from 0, with $t(35)=8.595$, $p<.001$ and $t(35)=9.225$, $p<.001$, respectively. More important than the comparison against 0 is the consistent appearance of shared senses across word pairs, and the observation that they account for over half of all extended senses (Table 1).

Conclusions

➤ Besides agreement on core senses of words, English and Chinese words consistently share a considerable number of polysemous senses despite their historical independence.

➤ The fact that slightly over half of the polysemous senses are shared in English and Chinese is intriguing in two ways.

❖ The substantial number of non-shared senses suggests language-specific contributions of differing cultures, religions, histories, development in science and technology in the extensions of word senses. For example, English *mouse* gained a new sense in the computer age; however, in a culture where that mammal is less familiar, the name for the computer device may be taken from another base word.

❖ However, the large number of shared senses suggests shared principles of word extension. Investigations of the basis of these, including the role of salient features, are ongoing.

Table1

Number of Shared Senses for Paired Stimulus Words of Three Word Classes

Note. Cols. 2 & 3: numbers in parentheses indicate the total number of senses, including core. Cols. 4 & 5: % of shared senses in extended senses, excluding core.

	English Words	Chinese Words	% Shared_E	% Shared_C
Nouns	head (7)	头 (6)	83.33%	80%
	world (3)	世界 (2)	50%	100%
	hand (5)	手 (4)	25%	33.33%
	doctor (3)	医生 (3)	0%	25%
	foot (3)	脚 (6)	50%	20%
	tree (3)	树 (2)	50%	100%
	face (3)	脸 (3)	100%	100%
	door (2)	门 (3)	100%	50%
	heart (6)	心 (3)	40%	100%
	flower (3)	花 (6)	50%	20%
	mouth (2)	嘴 (3)	100%	50%
	table (3)	桌 (3)	50%	100%
Mean % Shared Noun Senses			58.19%	64.86%
Verbs	push (6)	推 (6)	80%	60%
	follow (4)	跟 (4)	33.33%	33.33%
	run (6)	跑 (3)	40%	100%
	win (2)	赢 (2)	100%	100%
	touch (3)	触 (4)	100%	66.67%
	hang (5)	挂 (4)	50%	66.67%
	listen (3)	听 (3)	50%	50%
	leave (3)	离开 (3)	50%	50%
	smell (4)	闻 (3)	66.67%	50%
	lead (3)	领 (3)	0%	0%
	eat (5)	吃 (4)	25%	33.33%
	die (3)	死 (3)	0%	0%
Mean % Shared Verb Senses			49.58%	50.83%
Adjectives	sweet (3)	甜 (4)	100%	100%
	safe (3)	安全 (3)	50%	50%
	short (7)	短 (3)	33.33%	50%
	rich (3)	富 (3)	50%	50%
	high (5)	高 (5)	50%	50%
	true (3)	真 (2)	100%	100%
	hot (3)	热 (3)	50%	50%
	broken (4)	破 (6)	66.67%	40%
	tight (4)	紧 (8)	100%	57.14%
	empty (3)	空 (3)	50%	50%
	heavy (4)	重 (9)	66.67%	25%
	simple (4)	简单 (3)	0%	0%
Mean % Shared Adj. Senses			59.72%	51.85%
Mean % Shared across Classes			55.83%	55.85%