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# **Embodied Semantics: A Cognitive Base for the Acquisition of Verb Meaning in Chinese**

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# Outline

- Introduction of physical action verbs (PA verbs)
- Hypotheses
- VV Compound construction in Mandarin Chinese
- Children's acquisition of PA verbs
- Embodied semantic properties in PA verbs
- Embodied Semantics: Physical Contact In PA verbs for different social purposes
- Conclusion
- Current and Future Work

- A generally accepted hypothesis:
  - The major driving force behind **the emergence of language** was not simply mutation, but the complex interactions and adaptations of genes and human behaviors.
- Human **perception** and **cognition** are **embodied** in language.
- The semantics and syntax of physical action verbs in a language are typical examples of language embodiment.

## Physical Action Verbs (PA Verbs)

- A **physical action verb** describes a human action involving a particular part(s) of the human body.

E.g.

Eyes: *glance, look, peek, stare*

Nose: *sneeze, smell*

Lips: *snog, kiss, buss, osculate*

Teeth: *bite, chew, grit, clench*

Mouth: *talk, speak, mouth, utter, articulate*

Hand(s): *touch, stroke, hit, beat, tap, rap, knock*

Arms: *embrace, hug, bosom, squeeze*

Feet: *walk, run, step, trot, jog, clip (feet)*

etc.

- ❖ Among the 334 PA verbs in Mandarin defined by Gao (2001), close to 90% (299) of which are hand action verbs.

## A typical sentence structure of a PA verb

- E.g., The girl picked the flower.
  - A human (girl) performs an act (pick) that causes a certain part of his/her body (hand) to enter into contact with an entity (flower) involved.
- **the girl**: subjective agent
- **pick**: predicate (the body part information embedded (e.g. **a hand action** with a certain manner known as “pick”))
- **flower**: objective patient

## A typical extended sentence structure of a PA verb

e.g,

*Using a serrated knife, the cook sliced the bread into desired shapes.*

### embodied meaning:

- *body part*: hand using an instrument to cut something
- *way of cutting*: the manner of the action known as *slice*

### specified meaning:

- *instrument*: a serrated knife,

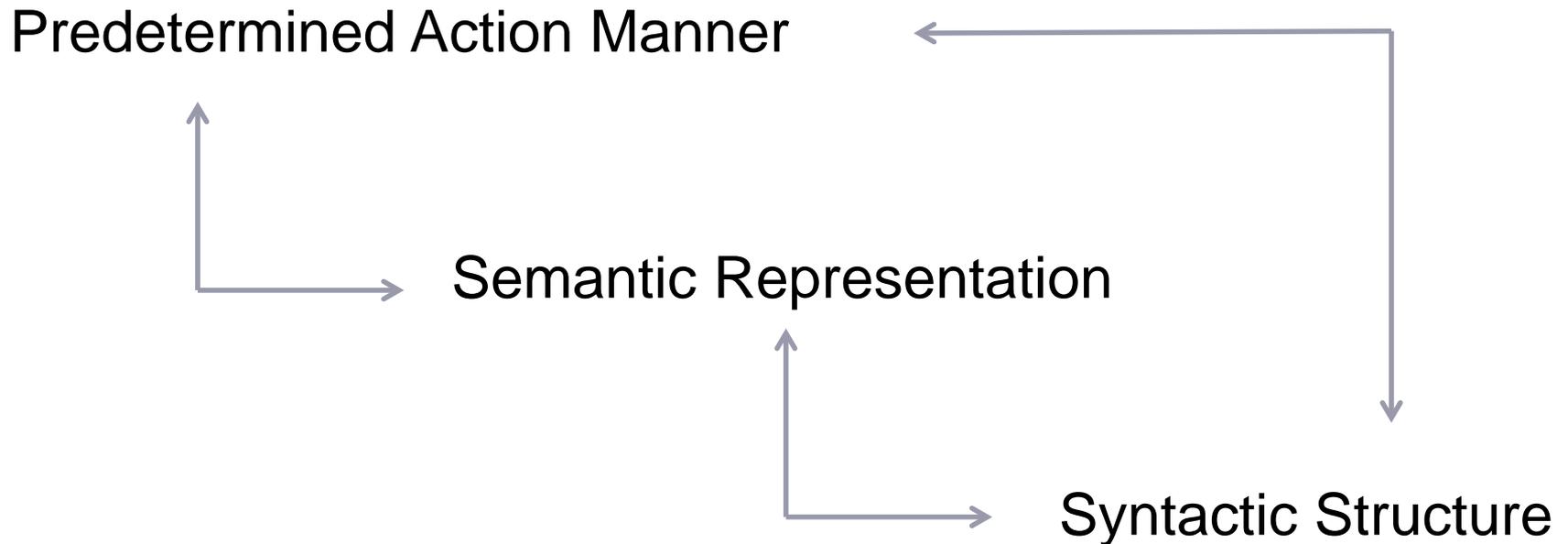
### causative result:

*cut apart, shape changed*: into.....shapes

## Physical Contact – An embedded concept in PA verbs

- A systematic study of PA verbs show that Physical Contact is an embedded semantic property in all PA verbs. A classification can be done by **the features of physical contact** as follows:
  - (1) Direct Contact (e.g., *bite, kiss, pinch, kick*)
  - (2) Contact with Instrument (e.g., *cut, comb, sew*)
  - (3) Contact as a Pre-Condition (e.g., *throw, put, toss*)
  - (4) Contact and Motion Coherent (e.g., *run, walk, climb*)
  - (5) Constant Contact (e.g., *sit, lie, stand*)
  - (6) Visual Contact (e.g., *see, look at, watch*)

# Semantic Representations of Physical Action Verbs



## Functional capability of the physical body

- The sentence construction that a PA verb can build is a linguistic display of the cognitive understanding of the functional capability of the human physical body.
- E.g.
  - *do the shoelace tightly/loosely*
  - \**undo the shoelace tightly /loosely*
  - *let go of the door handle*
  - \* *let go of the wall of the house*

# Hypotheses

1. The event structures of physical action verbs are not arbitrarily constructed but rather built through **systematic cognitive processes** in relation to both human physical reality and the reality in the world.
2. The **embodied semantics** and the **patterning of physical action verbs** show the cognitive aspect of how human encoded nonlinguistic information into the linguistic forms.

## PA verb VV compounds

- **VV compound (V + V)** word formation is one of the most distinctive features of Chinese.
- Construction:
  - Verb1 + Verb2 = a compound verb
  - All PA verbs are found to be able to form resultative VV compounds but not all other types.
  - Why?

# PA verb VV compounds

## 1. Cause resultative VV compounds

- V2 expresses a result to the direct object caused by V1.
- This result usually causes the object to have a change in its quality or state.

•e.g.,

他咬断了铅笔。

*Tā yǎo duàn le qiānbǐ.*

He bite break Le pencil

He bit the pencil and as a result the pencil was broken.

# PA verb VV compounds

## 2. Achievement VV compounds

- A VV compound makes its direct object achieve something or reach a certain state but this result does not give the object any change in quality, and thus,
- V2 is usually an adjectival verb.

• e.g.,

他擦干桌子了。

Tā cā gān zhuōzi le.

He wipe dry table Le

He wiped the table and as a result the table was dry.

# PA verb VV compounds

## 3. Direction resultative VV compounds

- V1 causes its direct object to be displaced or move toward a direction.
- Due to the contact effect on the object, V2 may indicate a motion of the object.
- e.g.,

他把球踢进了。

*Tā bǎ qiú tī jìn le.*

He Ba ball kick enter Le

He kicked the ball and as a result the ball went in(to the goal).

## PA verb VV compounds

- 4. Phase resultative VV compounds
  - The result is unspecified.
  - V2 expresses either the type of action described by V1 or the degree to which it is carried out.
- e.g.,

他包完了书。

*Tā bāo wán le shū.*

He wrap finish Le shu

He wrapped the book and he finished wrapping it.

## Physical capabilities vs. VV compound formation

	V1 + V2	Character	Pinyin	English equivalent
(a)	foot act + foot act	踢跑	tī-pǎo	kick-run
(b)	hand act + whole body act	打倒	dá-dǎo	beat-fall
(c)	hand act + foot act	推走	tuī-zǒu	push-go
(d)	hand act + mouth act	打哭	dǎ-kū	hit-cry
(e)	mouth act + mouth act	说笑	shuō-xiào	talk-laugh
(f)	mouth act + foot act	叫来	jiào-lái	call-come

## Corpus Data of the Physical Action VV Compounds

Percentage rate of the causative VV constructions formed by PA verbs in the Sinica Corpus

Bodypart	Total Number of Examples	Causative Construction Percentage
Hand(s)	7005	19%
Foot	173	10%
Arms	174	9%
Mouth	1230	7%
Teeth	79	6%
Fist	17	6%
Fingers	84	5%
Shoulder	47	4%
Buttocks	99	4%
Head	96	1%
Lips	90	1%
Back	44	0%
Knee	39	0%

## Percentage rate of the combinability of two PA verbs forming into a VV compound found in the Sinica Corpus

Bodypart	Number of Examples Found in the Corpus	Number of Different Verbs Applied in a VV Compound	Percentage of the Total Physical Contact Verbs
Hand(s)	1014	71	23%
Mouth	59	10	3.2%
Foot	59	8	2.6%
Whole Body	39	3	1.0%
Arms	1	2	0.6%
Teeth	0	0	0%
Shoulder	0	0	0%
Buttocks	0	0	0%
Head	0	0	0%
Lips	0	0	0%
Back	0	0	0%
Knee	0	0	0%

# Summary

- The patterning of physical action verbs into the VV compounds in Chinese reflects human cognition of the physical capability and the sequential ordering of the action events.
- The more possible actions that a part of the human body can perform, the more flexible the corresponding verbs are in combination with other verbs.

# Questions

- Then,
- how much cognition is involved in the acquisition of a simple PA verb?
  
- That is,
- what cognitive abilities does a child need while learning and using a PA verb correctly?

# The embodied semantic properties in a class of PA verbs

- E.g., **Putting Verbs** in Mandarin Chinese

Character	Pinyin	English Equivalents
摆	<i>bǎi</i>	place, put, arrange, set
放	<i>fàng</i>	put, place
搁	<i>gē</i>	put, leave over

# Embodied semantic properties in Putting Verbs

- I. Body part information for the action
  - **Hand** (true to all members of the class)
- II. Manner distinctions
- III. Intention(s) of the agent subject
- IV. Properties of the Patient objects
- V. Results caused to the patient objects
- VI. Semantic distance between the class members

# Embodied semantic properties in Putting Verbs

## II. Manner distinctions

### •A. Force

- a. moderately: true to all class members
- b. effectively: true to all class members

### •B. Motion directions

- a. from hand level to ground level: true to all class members
- b. from higher than hand level down to ground level: 放 *fàng*
- c. parallel to hand level: 摆 *bǎi*

### •C. Speed

- a. moderately: true to all class members
- b. slowly: 摆 *bǎi*

### •D. Duration

- a. instantaneous: 放 *fàng*, 搁 *gē*
- b. non-instantaneous: 摆 *bǎi*

# Embodied semantic properties in Putting Verbs

## III. Intention(s) of the Agent subject

### A. deliberately & cautiously

- a. put in a particular state: 放 *fàng*
- b. put in or as if in a particular place: 搁 *gē*
- c. put into a proper order or suitable relationship, or adjustment: 摆 *bǎi*

# Embodied semantic properties in PA verbs

## IV. Properties of the Patient objects

- a. any object that hands can hold up: 摆 *bǎi*, 放 *fàng*, 搁 *gē*
- b. possibly big enough to need more hands: 放 *fàng*

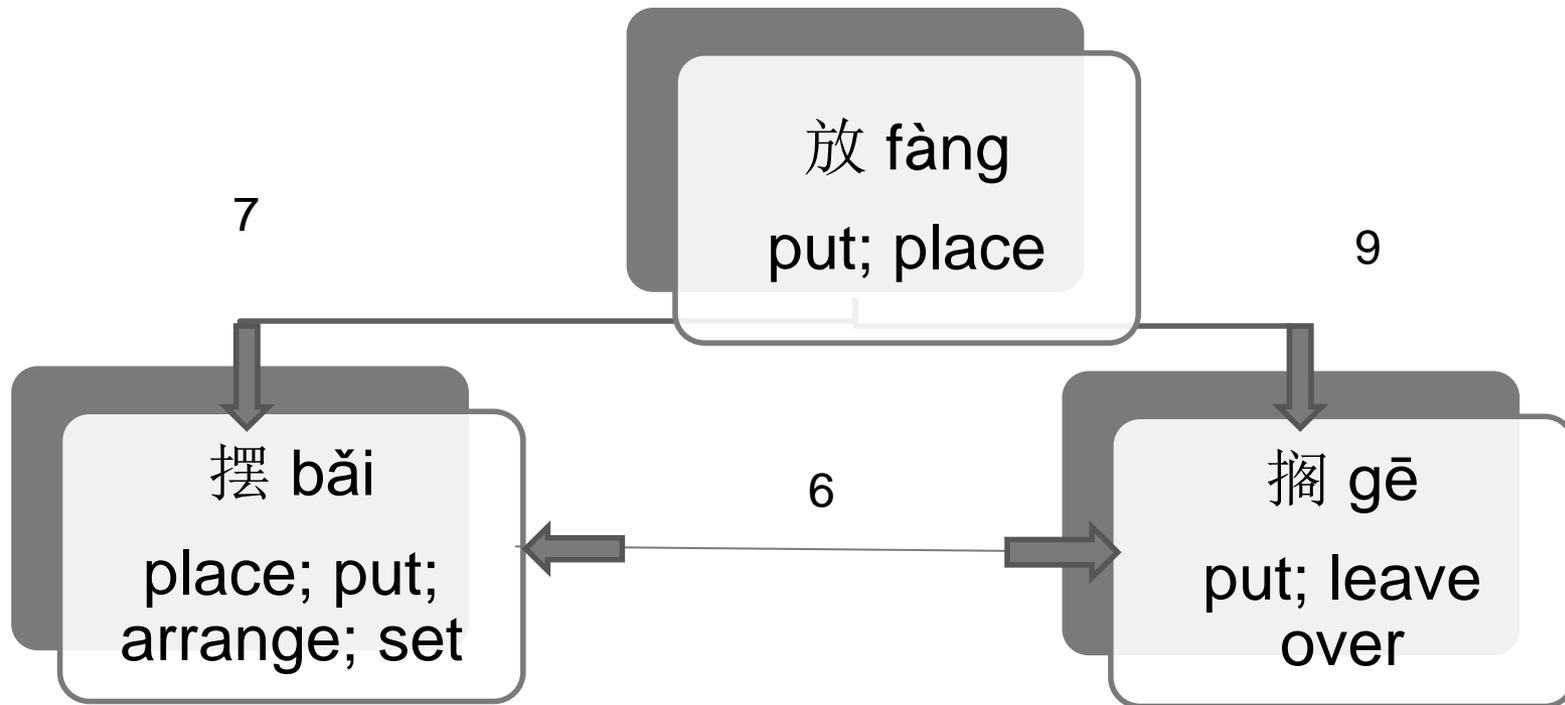
# Embodied semantic properties in PA verbs

## V. Results caused to the Patient objects

- a. moved to a new location: 放 *fàng*, 搁 *gē*
- b. set in order or position: 摆 *bǎi*, 放 *fàng*
- c. set in position: 放 *fàng*
- d. displayed: 摆 *bǎi*
- e. put in and mixed with other items: 放 *fàng*, 搁 *gē*

## VI. Semantic distance between the class members

According to the number of semantic properties shared

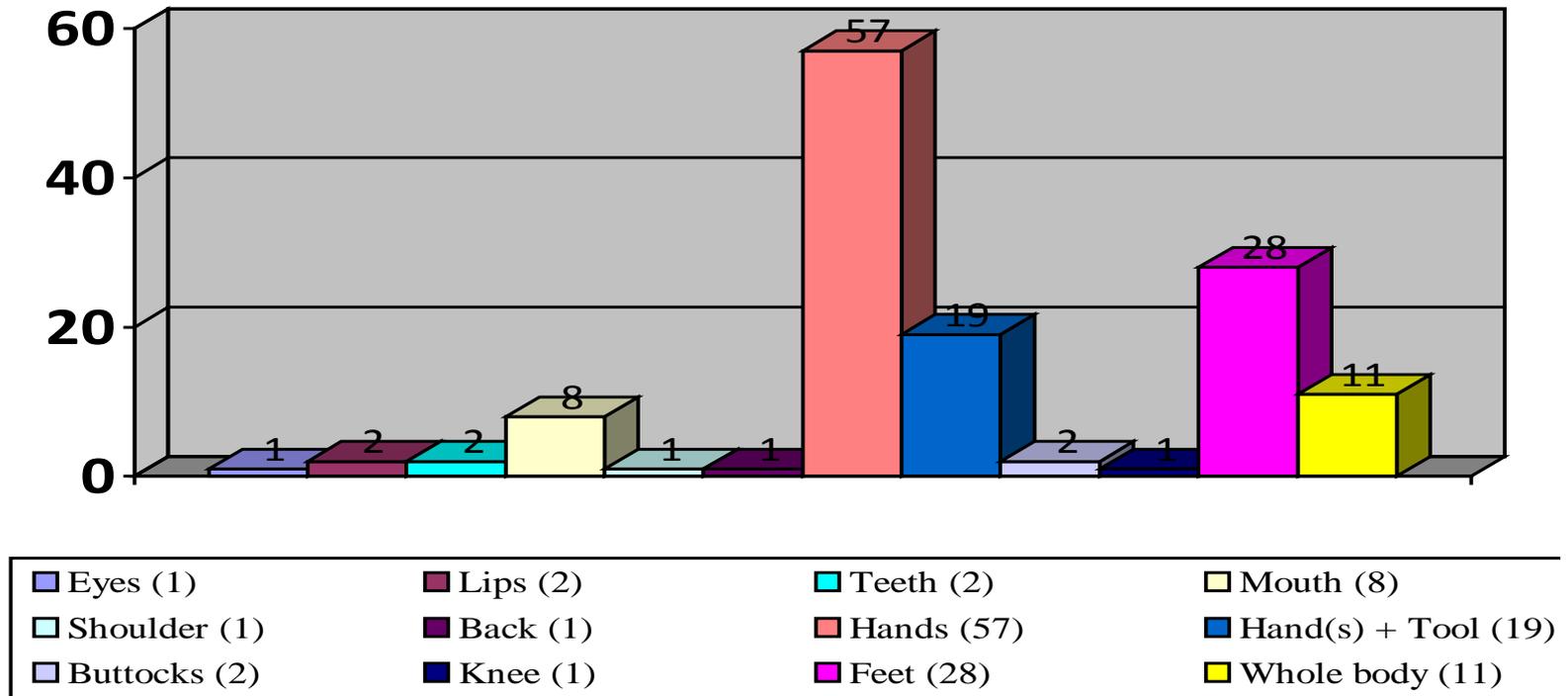


# PA verb acquisition by young children

Figure 1. Children's Production of Physical Action Verbs Classified Based on Body Part Involvement

**Age: Between 1.9 and 2.3 Years Old**

Total: 19 monolingual children



(Gao, 2013)

Children's cognitive understanding of their own bodily actions reflected in the early production of PA verbs by English, Swedish and Chinese young children

English	Age	Mandarin	Age	Swedish	Age
kick	1;6.0	ti	1;9.10	sparka	2;0.16
bite	1;11.0	yao	1;9.21	bita	1;11.17
bang	2;2.0	dong	2;3.2	banka	2;0.16
knock	2;3.18	ke	2;1.4	knacka	1;11.8

(Gao,2001)

# Summary

- Children are able to acquire many PA verbs at a very early age and use them correctly because they are the verbs that describe the most daily events they observe and they are involved in.
- Their increased cognitive abilities allow them to map the knowledge they acquired from their physical involvement in their daily events to the language structures they hear and use every day.

# Physical Contact as Social Interactions

- Verbs of Intentional Action
  - Verbs of Physical Contact for Love and Friendliness
  - Verbs of Physical Contact for Punishment and Revenge

# Embodied Semantics:

Body parts conventionally  
chosen for contact for different  
purposes

# Two contrastive examples

- (1) 他拍了拍孩子的脸蛋儿。
- Tā pāi le pāi háizi de liǎndànr.
- He pat Le child de cheek
- He patted the child on the cheek.
- 
- (2) 他打了孩子一个嘴巴。
- Tā dǎ le háizi yí ge zuǐba.
- He hit Le child one CL face
- He slapped the child on the face.

挨了三下儿

ái le sān xià

- suffer (hit) three times

- 

挨过一回

- ái guo yì huí

- suffer (beat) once

## Native Speakers' Understanding of Physical Contact

- Native Speakers' understanding of on what body part one can have contact with for different social purposes
- Compatible to linguistic expressions found in corpus

# I. Body parts conventionally chosen for contact for the purpose of showing love or friendliness

## A. Adults to children:

- (a) all body parts as a whole
- (b) upper part of the body
- (c) head
- (d) shoulders
- (e) face
- (f) nose
- (g) hand
- (h) buttock

## B. Children to adults:

- (a) upper part of the body
- (b) neck
- (c) face
- (d) hand or arm
- (e) leg

## C. Adults to adults:

- (a) upper part of the body
- (b) face or mouth
- (c) shoulders
- (d) arm
- (e) hand

## II. Body parts conventionally chosen for contact for the purpose of punishment or revenge

### A. Adults to Children:

- (a) face
- (b) hand
- (c) buttock

### B. Adults to Adults:

- (a) face
- (b) any part of the body

# Conclusion

- The semantics and event structures of physical action verbs are the linguistic representations of human perception and cognition.
- There is thus a correlation between language structure and cognitive structure.
- By analyzing the correlation, we can explain how cognitive, perceptual, or experiential facts constrain or otherwise determine the linguistic facts.
- The patterning and frames of the sentence structures of PA verbs are compatible with the settings and contours of the physical actions depicted by the corresponding verbs.

## Current and Future Research

### Current:

- How and when children lay the cognitive foundation for the acquisition of PA verbs
- How L2 speakers' maintain or adjust their cognitive understanding of concepts acquired in L1 in the process of adapting to their L2 social environment.
- Language acquisition modelling

### Future:

- Cognitive semantics with a focus on the meaning extensions
- of PA Verbs in Chinese
- How children acquire the subtle differences between lexical synonymies

# A Linguistic Principle Compatible with Physical Reality

- Compatible with the fact that a sentence is not only an ideal unit of discourse but also an operationally necessary element in continuous behavior (Allott 1991)
- This finding prompts us to make a further assumption:
  - **The linguistic principle for the construction of a sentence with a physical action predicate is assumed to be formed from human physical reality.**

Thank you !