The Processing of Affixation and Compounding in Chinese

National Chung Cheng University

Graduate Institute of Linguistics

Wang, Wen-Ling & James Myers

Goals

- Test whether suffixed and compound words are processed differently in Chinese
- Test whether stimulus context plays a role in morphological processing

Why look at Chinese?

- Problems with Chinese (Packard, 2000)

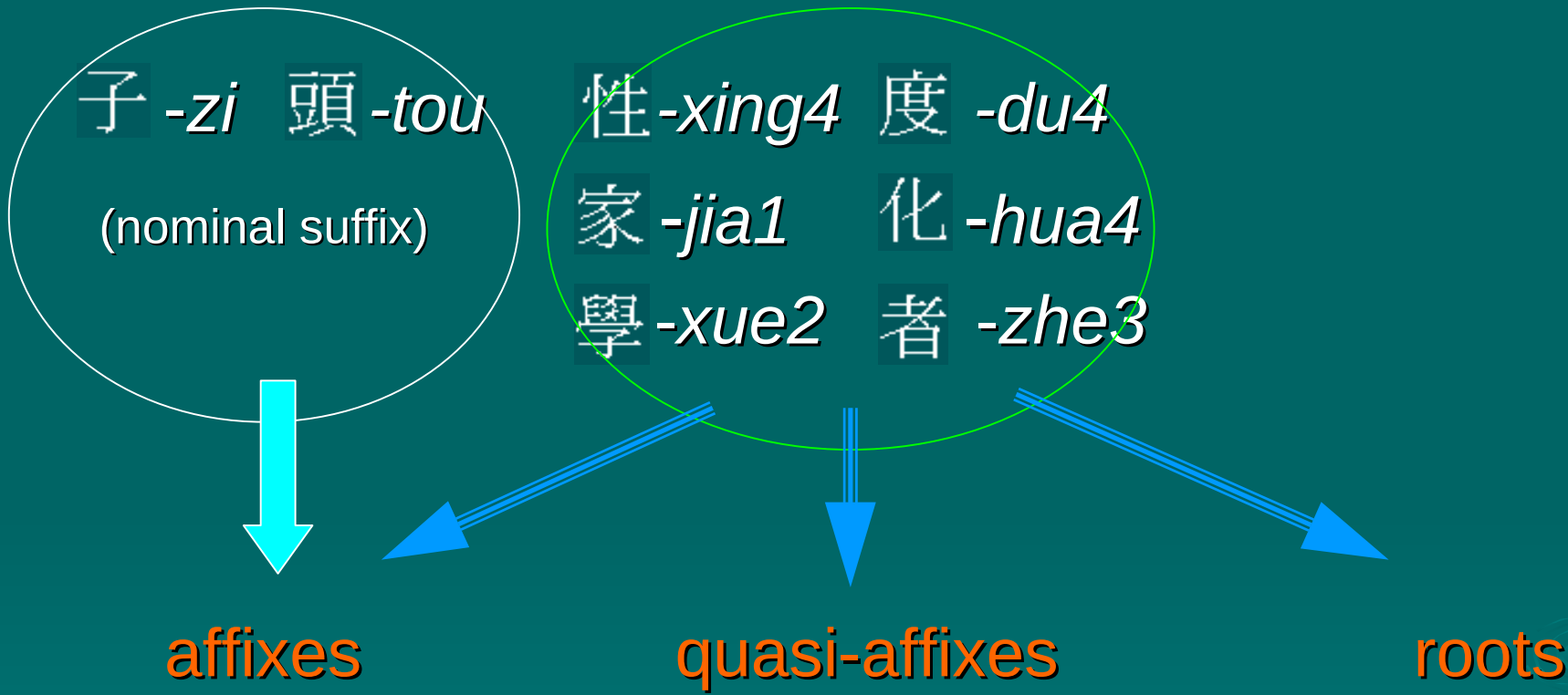
  Distinction between Affixes & Bound Roots

e.g. 員 *yuan2* “person”

vs.

者 *zhe3* “one who does/is X”

- Disputes over categorization



Compound decomposition

- Morpheme frequency effects

  English: Taft & Forster (1976)
  Andrews (1986)

  Chinese: Zhang & Peng (1992)

- Component repetition priming effects

  Zhou & Marslen-Wilson (1995)
  Li (1995)
  Zhou, Marslen-Wilson, Taft, & Shu (1999)

Suffixed word decomposition?

- Inconsistent morpheme frequency effects

  Taft (1979)
  Andrews (1986)

- Weaker component repetition priming

  Stanners, Neiser, Hernon, & Hall (1979)

  Fowler, Napps, & Feldman (1985)

- Prefix stripping vs. suffix stripping (Taft, 1985)

A diagnostic for affixation

- A possible context effect:
  - Compounds are obligatorily decomposed, but suffixed words are not?

e.g. Andrews (1986)

Suffixed words: no morpheme frequency effect

Compound words: significant morpheme frequency effect

Mixed: both had morpheme frequency effect

Our experiments

- Exp 1a-c: Replications of Andrews (1986)
- Exp 2a-c: Visual component priming
- Overall design
  - Suffixed and compound stimuli matched for first morpheme frequency, surface frequency, and character complexity
  - Exps a-b: Suffixed and compound stimuli presented alone; Exp c: Suffixed and compound stimuli presented together

Experiment 1a: Morpheme frequency effect for suffixed words?

- Materials
  - Most “suffix-like” suffixes chosen based on semantic pretests
  - 76 suffixed words with matched surface frequency but varied morpheme frequency:
    - 38 with high morpheme frequency (HMF) &
    - 38 with low morpheme frequency words (LMF)
  - Occurrences of suffix types were evenly distributed
  - The same design for nonword items (formed of real characters)

- *Examples of experimental items*

  HMF: 網子 *wang3zi* “net”

  LMF: 瓶子 *ping2zi* “vase”

- *Examples of nonword items*

  HMF: 鮮子 *xian1zi*

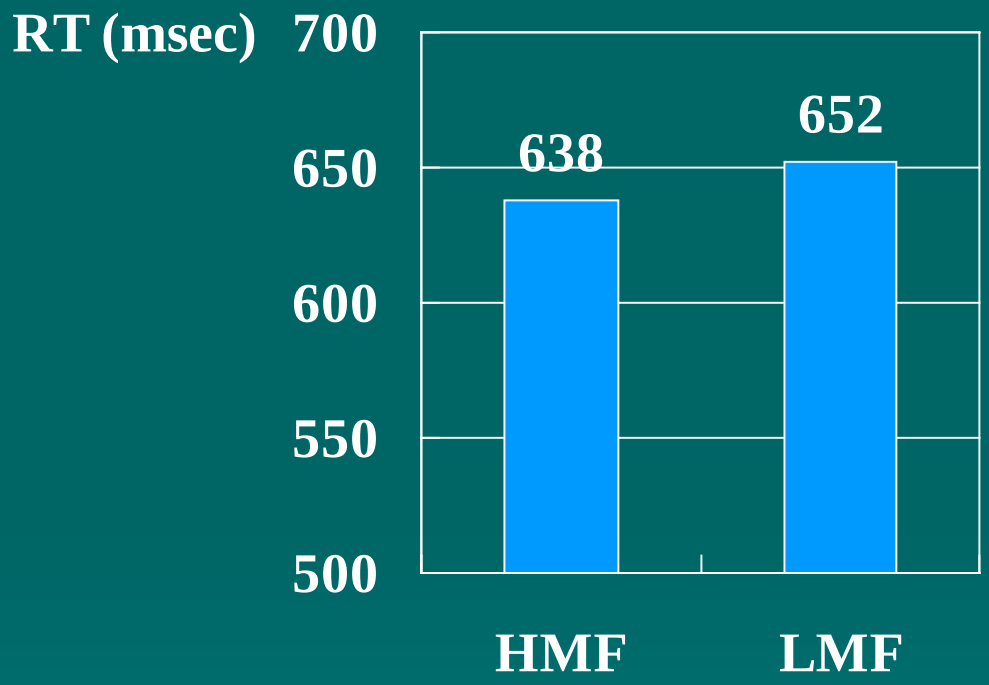
  LMF: 匯子 *hui4zi*

- *Participants*

  25 Mandarin-speaking university students in southern Taiwan

Experiment 1a: Results

- Mean RT



- By participant, $p > 0.05$
- By item, $p > 0.1$
- RT for HMF was ***not*** significantly shorter than for LMF

Experiment 1a: Discussion

- Lack of morpheme frequency effect for suffixed words (consistent with Andrews, 1986, and other previous work on English)

- A trend in the direction of a morpheme frequency effect, however.

Experiment 1b: Morpheme frequency effect for compound words?

- Materials
  - 76 transparent compound words with matched surface frequency but varied morpheme frequency:
    - 38 with high morpheme frequency (HMF) &
      38 with low morpheme frequency words (LMF)
  - The same design for nonword items

- *Examples of experimental items*

  HMF: 舊書 jiu4shu1 “old book”

  LMF: 蜂窩 feng1wo1 “beehive”

- *Examples of nonword items*

  HMF: 忍明 ren3ming2

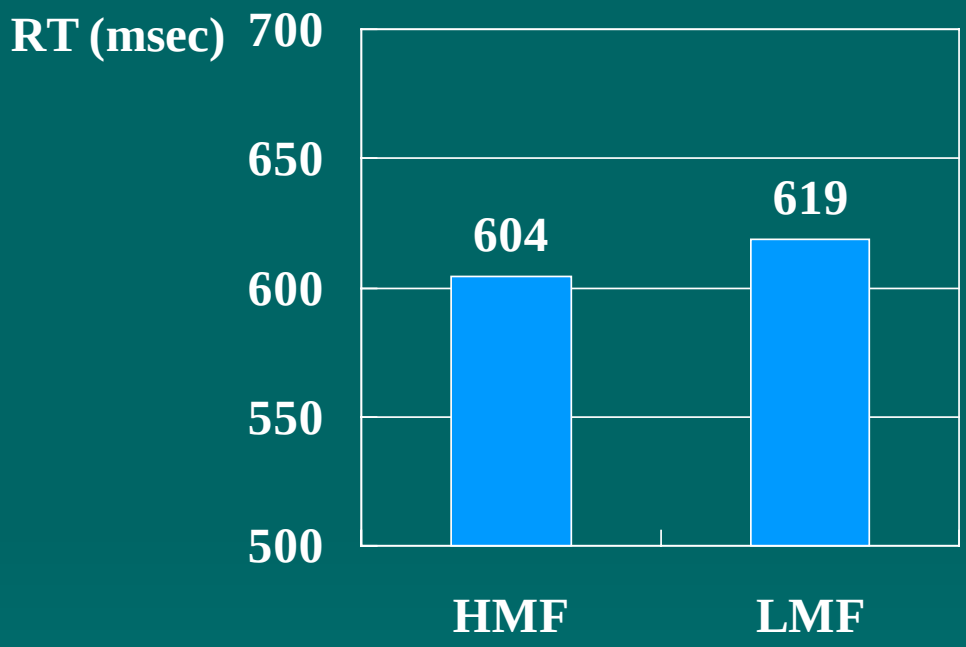
  LMF: 紗捏 sha1nie1

- *Participants*

  25 Mandarin-speaking university students in southern Taiwan (different from previous ones)

Experiment 1b: Results

- Mean RT



- By participant, $p < 0.05$
- By item, $p > 0.1$
- RT for HMF was ***shorter*** than for LMF

Experiment 1b: Discussion

- First morpheme frequency effect found for compounds (replicates Andrews, 1986, and other previous work on English)

- Although the RT differences is now significant, it is not significantly larger than for Exp. 1a (no Exp x MorphFreq interaction: $p > 0.5$ by participant and by item)

Experiment 1c: Morpheme frequency effect for both types when mixed?

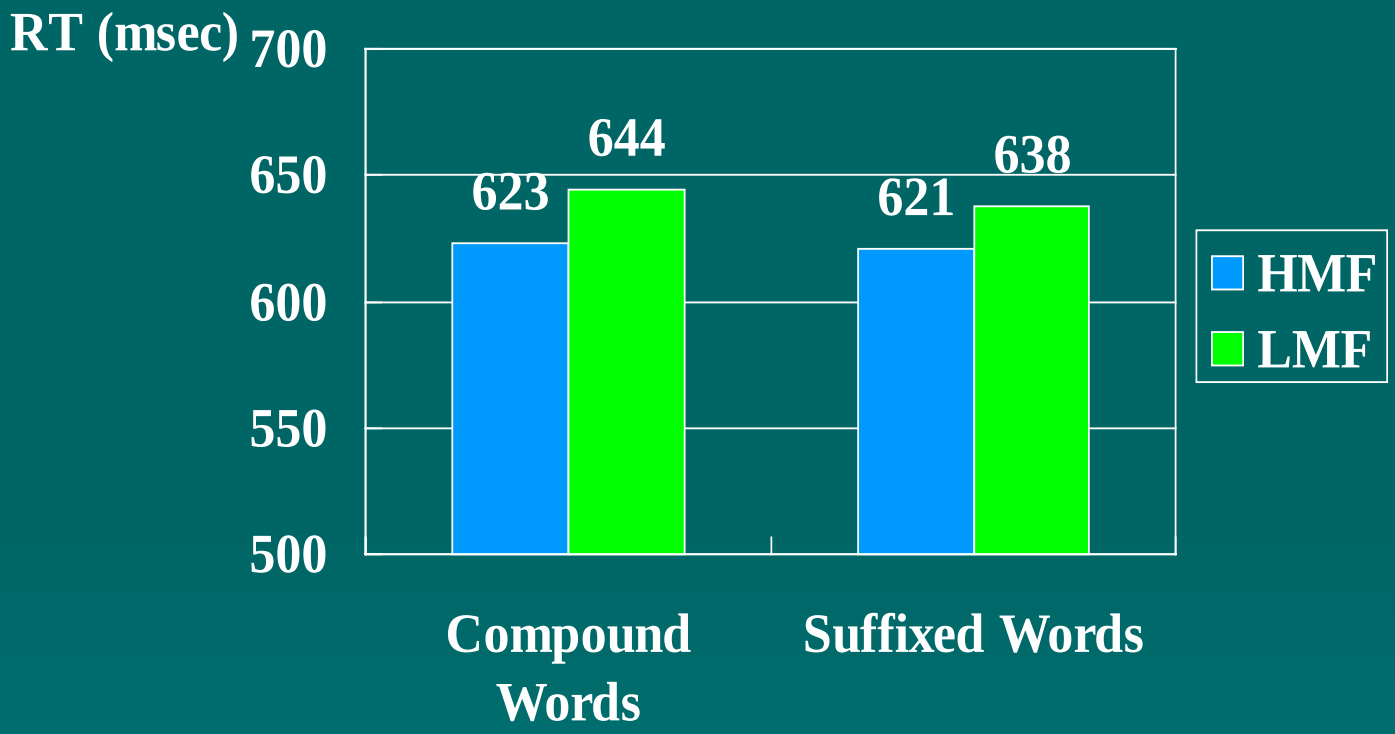
- Materials
  - Stimuli from Experiments 1a-b combined together

- Participants

  25 Mandarin-speaking university students in southern Taiwan (different from previous ones)

Experiment 1c: Results

- Mean RT



- **No effect of morphological type**
  By participant & by item, $p > 0.5$
- **Significant effect of morpheme frequency**
  By participant, $p < 0.0001$; by item, $p < 0.05$

Experiment 1c: Discussion

- The context effect replicates Andrews (1986)
- Positive morpheme frequency effect for both suffixed and compound words
- Suffixed words seem to be processed differently when alone vs. when in mixed context, though Exp x MorphFreq interaction is still not significant ($p > 0.5$ by participant & by item)

Experiment 2a: Component priming of suffixed words

- Materials
  - **Targets: 24 Chinese single-character words**
    24 noncharacters
  - **Priming conditions: Identical (IDEN)**
    Suffixed (SUF)
    Unrelated (UNREL)

	Prime		
Target ***(Character)***	IDEN	SUF	UNREL
磚 *zhuan1* ‘brick’	磚 *zhuan1* ‘brick’	磚頭 *zhuan1tou* ‘brick’	翼 *yi4* ‘wing’

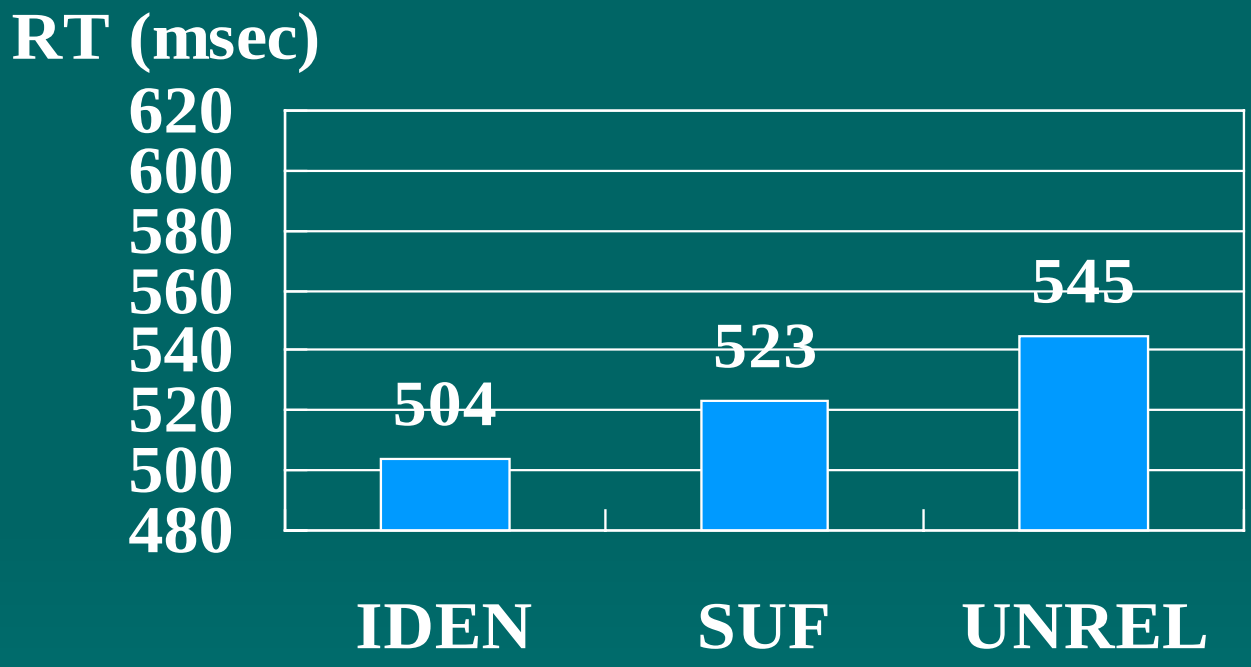
Target (Noncharacter)	Prime		
	IDEN	SUF	UNREL
	斧 *fu3* 'hatchet'	斧頭 *fu3tou* 'hatchet'	盟 *meng2* 'covenant'

- *Participants*

  21 Mandarin-speaking university students in southern Taiwan (different from previous ones)

Experiment 2a: Results

- Mean RT



- **Main effect of prime types in RT analyses**

  By participant, $p < 0.001$; by item, $p < 0.01$

  Mean RT: IDEN & SUF < UNREL (Tukey HSD)

Experiment 2a: Discussion

- Suffixed words primed their bases
- Inconsistent with Experiment 1a
- This is due to slow UNREL RT of 2 participants:

	UNREL	SUF	Priming
Subj. 18	726	619	106
Subj. 19	820	654	166

SUF RT for others: 393-669 msec

UNREL RT for others: 397-635 msec

Experiment 2b: Component priming of compound words

- Materials
  - **Targets: Same targets as Exp. 2a**
  - **Priming conditions: Identical (IDEN)**
    Compound (COMP)
    Unrelated (UNREL)

	Prime		
Target ***(Character)***	IDEN	COMP	UNREL
磚 *zhuan1* ‘brick’	磚 *zhuan1* ‘brick’	磚牆 *zhuan1qiang2* ‘brick wall’	翼 *yi4* ‘wing’

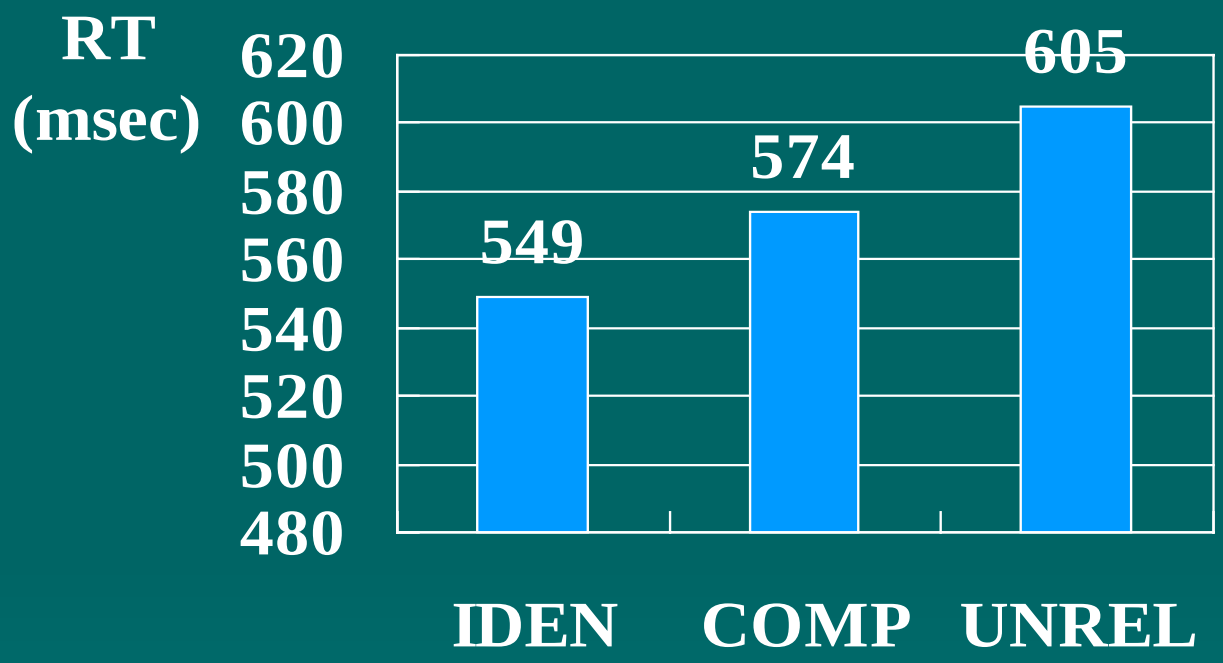
Target (Noncharacter)	Prime		
	IDEN	SUF	UNREL
	盟 meng2 'covenant'	盟邦 *meng2bang1* 'ally'	斧 *fu3* 'hatchet'

- *Participants*

  21 Mandarin-speaking university students in southern Taiwan (different from previous ones)

Experiment 2b: Results

- Mean RT



- **Main effect of prime types in RT analyses**
  By participant, $p < 0.0001$; by item, $p < 0.05$
  Mean RT: IDEN < COMP < UNREL (Tukey HSD)

Experiment 2b: Discussion

- Compound words primed their first position morphemes
- Consistent with Exp. 1b

Experiment 2c: Effect of mixing both types on component priming

- Materials

  Stimuli from Exps. 2a-b

Target ***(Character)***	***Prime***			
	IDEN	SUF	COMP	UNREL
磚 *zhuan1* ‘brick’	磚 *zhuan1* ‘brick’	磚頭 *zhuan1tou* ‘brick’	磚牆 *zhuan1qiang2* ‘brick wall’	翼 *yi4* ‘wing’

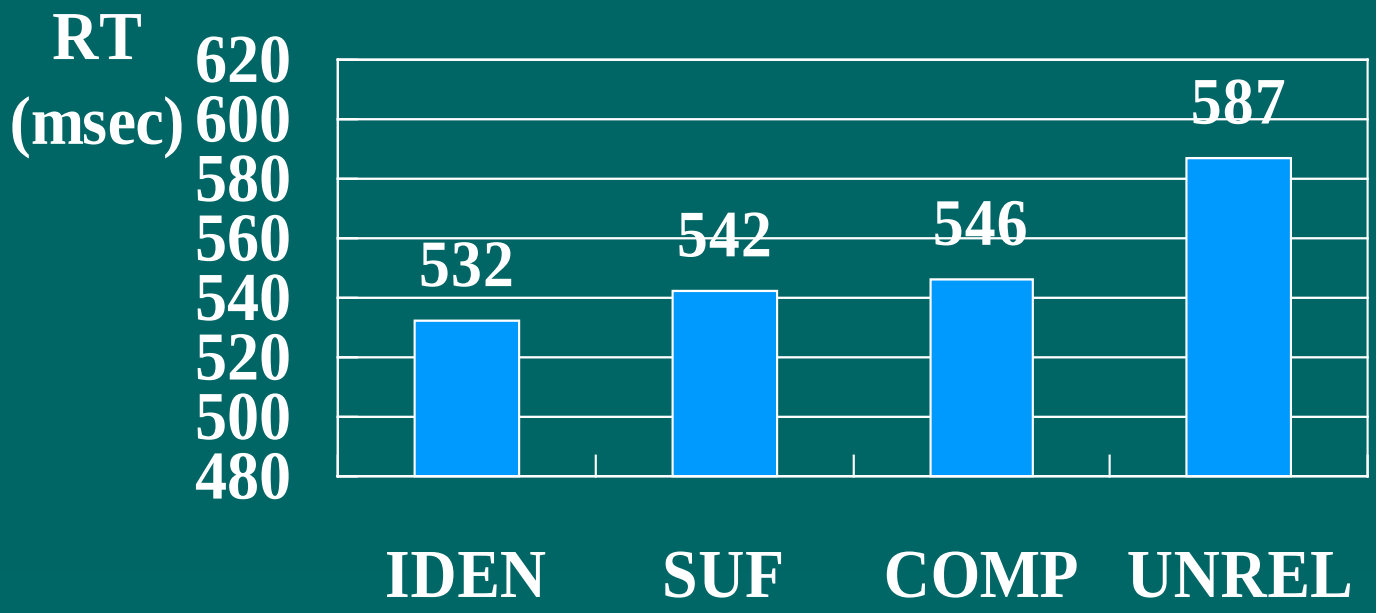
Target (Character)	Prime			
	IDEN	SUF	COMP	UNREL
	斧 *fu3* *'hatchet'*	斧頭 *fu3tou* *'hatchet'*	盟邦 *meng2bang1* *'ally'*	盟 *meng3* *'covenant'*

- *Participants*

  20 Mandarin-speaking university students in southern Taiwan (different from previous studies)

Experiment 2c: Results

- Mean RT



- **Main effect of prime types in RT analyses**
  By participant, $p < 0.0001$; by item, $p > 0.05$
  Mean RT: IDEN, SUF, COMP < UNREL (Tukey HSD)

Experiment 2c: Discussion

- Both suffixed & compound words primed their constituent morphemes
- Suffixed priming effect when alone vs. when mixed with compound words: consistent with Exp 1c?
- Decomposition of Chinese suffixed words as a strategy induced by stimulus context?

General discussion

- Suffixed and compound words in Chinese seem to be distinguishable in processing, though the evidence so far is weak

- Stimulus context may affect lexical processing