

# Ultimate attainment of anaphora resolution in L2 Chinese and the implications on teaching

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# Interface hypothesis

- The original hypothesis distinguishes narrow syntax from interfaces between syntax and cognitive domains in general in language acquisition (Sorace 2005).
- It proposes that language structures involving interfaces are less likely to be acquired completely.
- By contrast, the structures that only involve syntactic computations are predicted to be fully acquirable in second language (L2) acquisition and also retainable in first language (L1) attrition. They are also predicted to be acquired early in bilingual L1 acquisition.

# Interface Hypothesis

- The IH later divides interfaces into internal interfaces (i.e., between components of the language system such as the syntax-semantics interface) and external interfaces (i.e., between syntax and a cognitive system not specific to language, such as the syntax-discourse interface)
- The internal interfaces are assumed to be unproblematic, whereas the external interfaces are the locus of ultimate fossilisation in L2 acquisition and also of protracted delays in bilingual first language acquisition. They are also easily affected under reduced input conditions in L1 attrition.

# Supporting evidence

- Distribution of null and overt pronouns in null-subject languages.
- The discourse-pragmatic constraints of the distribution of pronominal forms posed problems but not the syntactic licensing of *pro*
  - in simultaneous bilingual first language acquisition (e.g. Serratrice et al. 2004; Sorace et al. 2009)
  - L1 attrition (e.g. Tsimpli et al. 2004)
  - heritage speakers (Montrul 2004)
  - L2 ultimate attainment (e.g. Sorace and Filiaci 2006).
- Empirical evidence supporting the successful L2 acquisition of internal interfaces have been reported for the lexicon-syntax interface in Montrul (2005) and for the lexicon-semantics interface in Montrul and Slabakova (2003) and Tsimpli and Sorace (2006), among others.

# Acquirability of external interfaces

- Ivanov (2012) shows that advanced English-speaking learners have acquired the pragmatic meaning of clitic doubling in Bulgarian.
- Iverson et al. (2008) report that advanced L2 learners of Spanish have acquired the discourse-dependent distinction between the indicative and subjunctive complements with epistemic predicates.
- Kraš (2008) finds that near-native Croatian-speaking learners have acquired the discourse-pragmatic constraints on the interpretation of overt and covert pronouns in sentences with temporal clauses.
- Rothman (2009) finds that some highly advanced L2 Spanish learners displayed correct distribution of overt and null subject pronouns that are subject to both syntactic and pragmatic constraints in different contexts in several tasks.
- Slabakova and Ivanov (2011) find no residue optionality in near-native speakers' L2 Bulgarian and L2 Spanish regarding the syntax-discourse knowledge of clitic dislocation.
- Slabakova et al. (2012) report that L2 learners of Spanish acquired the discourse-sensitive properties of clitic left-dislocation and focus fronting.
- Zhao (2012a) finds that  $\emptyset_{\text{topic}}$  at the syntax-discourse external interface has been acquired by L2 learners of Chinese. Furthermore, it was acquired in different sentence positions at different proficiency levels.

- To quote Sorace and Filiaci (2006: 340), ‘....the interface properties involving syntax and another cognitive domain may not be fully acquirable.’
- The use of *may not* and *fully* covers every possible situation in the acquisition of external interfaces, making IH unfalsifiable in this respect.
- Despite this, the studies above challenge IH in that they provide evidence opposite to the studies above that are interpreted as supporting the IH.
- As Slabakova et al. (2012: 329) point out, ‘the usefulness of a model that predicts that certain properties may or may not be acquired is questionable.’

- White (2011), after examining a wide range of studies, showed that external interface properties were either acquired or fossilised, just like those at internal interfaces. White proposes that not all phenomena at a particular interface are necessarily problematic or acquirable.
- Yuan(2010) finds that the acquirability of the syntax-semantics internal interface was not domain-wide in L2 grammars with respect to the licensing of existential polarity words (EPWs) in Chinese.

# The unacquirability of purely syntactic categories

- Coppeters (1987) reports differences between native and near-native L2 learners of French with respect to some purely syntactic distinctions on causative constructions and clitic pronouns.
- Sorace (1993) discovered that the L2 Italian grammars of neither English-speakers nor French-speakers have fully converged on the target grammar regarding the syntactic constraints on auxiliary change under reconstructing.
- Neither have the highly proficient Croatian-speakers in Kraš (2011).

# Contribution of the current study

- The current study mainly intends to contribute to the ongoing debate on the acquirability of purely syntactic properties through the acquisition of the cyclic-c-command condition on the overt pronoun *ta* 'he/she' in L2 Chinese of highly proficient adult English-speaking learners.
- It also hopes to make some contribution to the debate on the acquirability of the syntax-discourse interface through the acquisition of null subjects in complex sentences with temporal clauses that are proposed to be  $\emptyset_{\text{topic}}$ , a syntax-discourse interface category.

# Crosslinguistic differences

(1) Zhangsan<sub>i</sub> chi wanfan de shihou, ta<sub>i</sub>/e<sub>i</sub> dai zhe yi ding maozi.

Zhangsan eat dinner DE when he wear PRG one CL hat

‘When Zhangsan<sub>i</sub> was having dinner, he<sub>i</sub>/e<sub>i</sub> was wearing a hat.’

(2) \*ta<sub>i</sub>/e<sub>i</sub> chi wanfan de shihou, Zhangsan<sub>i</sub> dai zhe yi ding maozi.

he eat dinner DE when Zhangsan wear PRG one CL hat

‘When \*he<sub>i</sub>/e<sub>i</sub> was having dinner, Zhangsan<sub>i</sub> was wearing a hat.’

(3) When John<sub>i</sub> came in, he<sub>i</sub>/\*e was wearing a raincoat.

(4) When he<sub>i</sub>/\*e came in, John<sub>i</sub> was wearing a raincoat.

# Hung's explanation

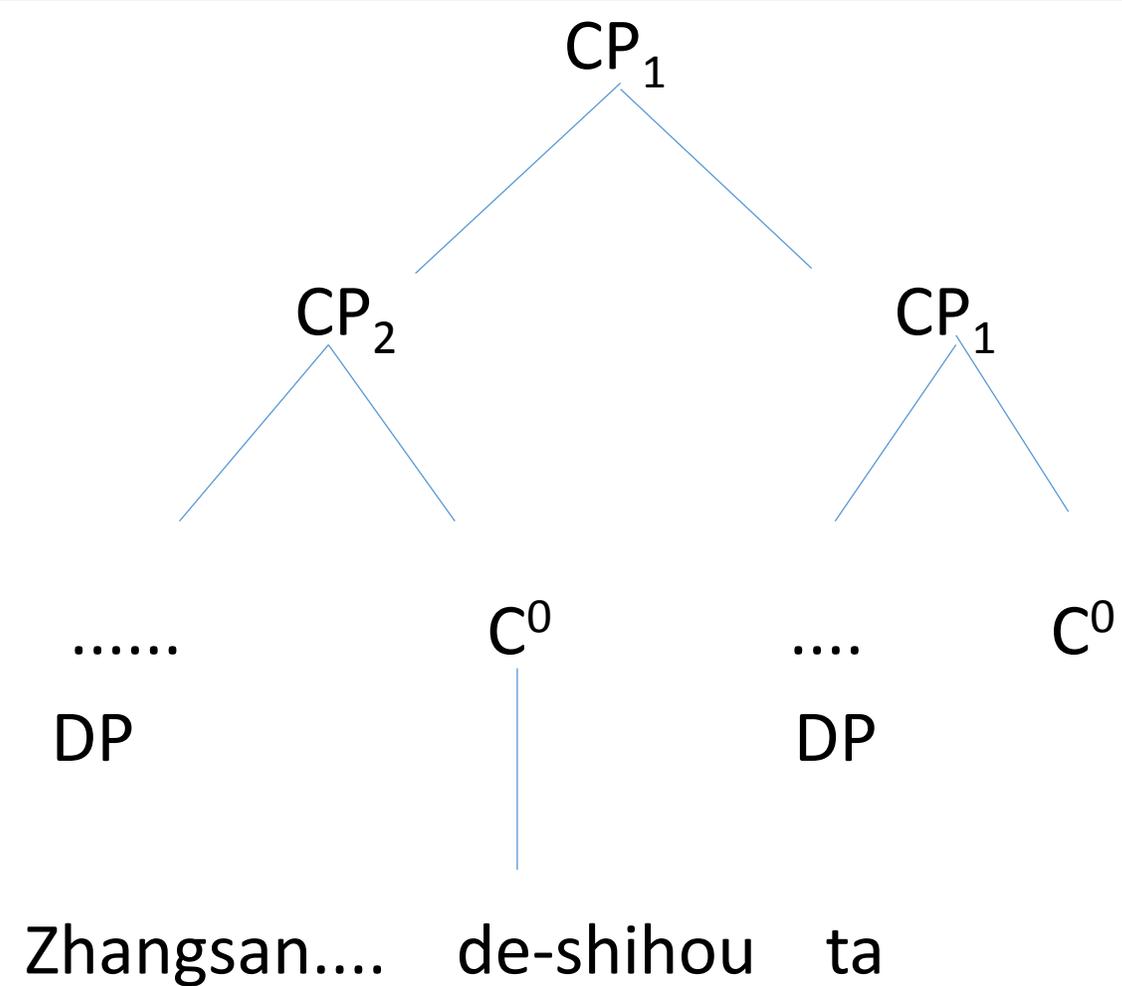
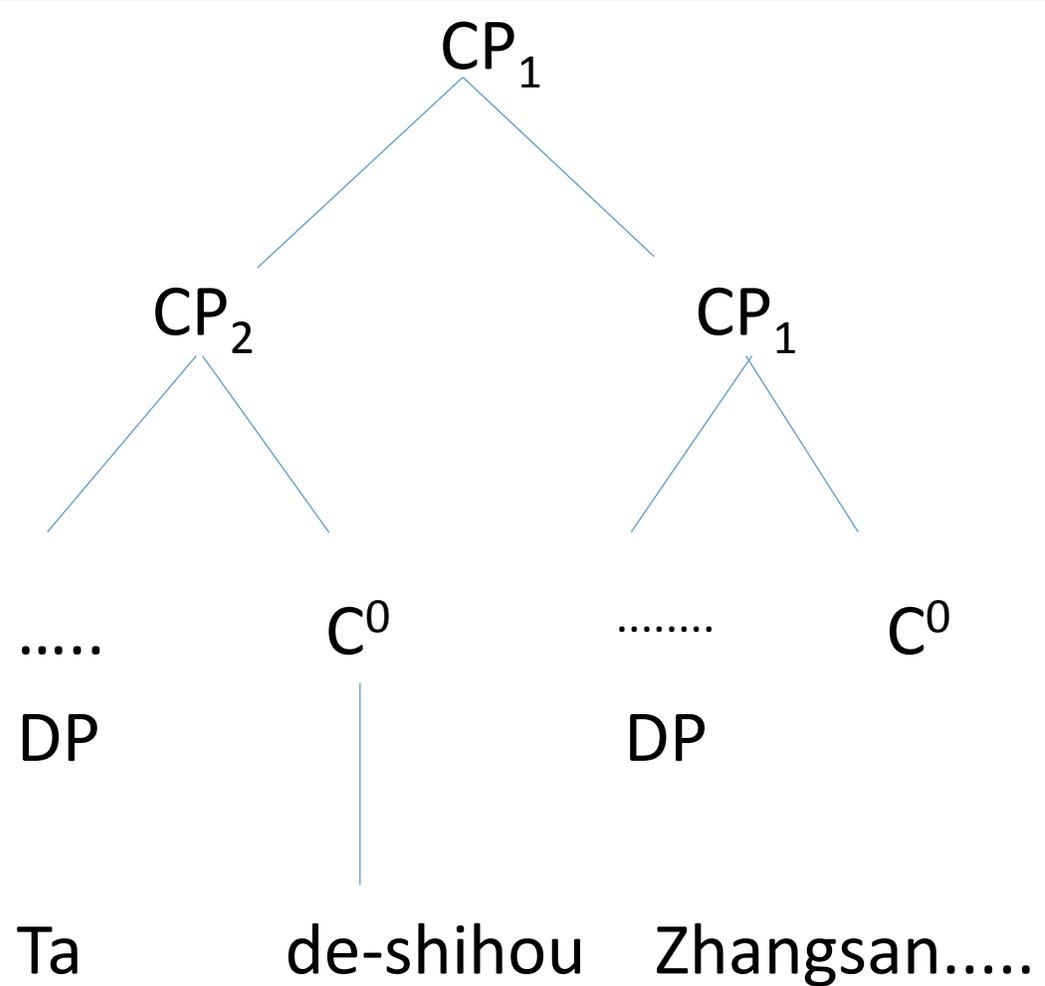
- Huang (1982) notes that while the English overt pronoun may not refer to a potential antecedent that it c-commands (derived from the Binding Principle C), the Chinese *ta* abides by a stricter structural condition below. The compulsory disjoint reading of *ta* in (2) (i.e., *ta* refers to someone other than *Zhangsan* in the sentence) is due to this condition.

A pronoun may not cyclic c-command its antecedent

Cyclic c-command: A cyclic c-commands B if and only if:

- a. A c-commands B, or
- b. If C is the minimal cyclic node (NP or CP) that dominates A but is not immediately dominated by another cyclic node, then C c-commands B.

(Adapted from Huang 1982: 394)



- He simply suggests that the condition in (5) is a special requirement on overt pronouns, and does not apply to null pronouns.---Slightly stipulative
- I argue that the null elements are not subject to the same condition as the overt pronoun in (1) and (2) because they are not null pronouns.

# Null pronouns

- Roberts (2010) proposes within MP that null pronouns result from PF deletion. A pronoun deletes from the subject position of Romance null-subject languages such as Spanish when it is the defective goal of T, i.e., when its formal features are properly included in those of its probe T.
- Spanish differs from English, a non-null-subject language, in that the Spanish T has a D(efiniteness) feature, whereas the English T does not. Without the D feature on T, it is impossible for the subject pronoun to be T's defective goal, as the pronoun intrinsically has a D feature. Roberts suggests that T's D-feature is related to rich agreement.

# The impossibility of null pronouns in Chinese

- Zhao (2008, 2012a, 2012b) argues that null pronouns are not allowed in Chinese.
- Chinese does not have agreement morphology at all, let alone rich agreement morphology. This means that the Chinese T does not have a D feature, and therefore the subject pronoun can never be the defective goal of T (Roberts 2010).
- Additionally, if the null element is a null pronoun, we cannot account for its interpretive asymmetry. If we replace the null element with the overt pronoun *ta*, the subject-object asymmetry disappears.

a. Zhangsan<sub>i</sub> shuo  $e_{i/j}/ta_{i/j}$  renshi Lisi.

Zhangsan say know Lisi

'Zhangsan<sub>i</sub> says that  $e_{i/j}/ta_{i/j}$  knows Lisi.'

b. Zhangsan<sub>i</sub> shuo Lisi renshi  $e_{*i/j}/ta_{i/j}$ .

Zhangsan say Lisi know

'Zhangsan<sub>i</sub> says that Lisi know  $e_{*i/j}/ta_{i/j}$ .'

# Øtopic in Chinese

- Chinese allows a Topic NP Deletion Rule, which operates across discourse to delete the topic of a sentence under identity with a topic in a preceding sentence, forming a topic chain, as below (e.g. Huang 1982, 1984).

Xiaoming<sub>i</sub> hen ai xuexi, [<sub>Top</sub> t<sub>i</sub>], t<sub>i</sub> tiantian kan shu,

Xiaoming very like study everyday read book

[<sub>Top</sub> t<sub>i</sub>], laoshimen hen xihuan [t<sub>i</sub>].

teachers very like

‘Xiaoming does not like studying, and (he) often skips classes, and the teachers do not like (him) at all.’

- Q: Zhangsan kanjian Lisi<sub>j</sub> le ma?

Zhangsan see Lisi PFV Q

‘Did Zhangsan see Lisi?’

A: Ta kanjian e<sub>j</sub> le.

he see PFV

‘He saw e<sub>j</sub>.’ (Adapted from Huang 1984: 533)

[<sub>TopicP</sub> ~~Lisi~~ [Ta [<sub>vP</sub> ~~Lisi~~ [<sub>vP</sub> kanjian ~~Lisi~~ le]]]].  
 he            see            PFV

- *Lisi* is base-generated as complement-V.
- Triggered by the Edge feature of v and Topic respectively, it then moves to Spec vP and finally to Spec TopicP, leaving a copy at every extraction site.
- All the lower copies are suppressed except for the one at Spec TopicP.
- Whether the topicalized object at Spec TopicP is spelled out or not is a discourse issue. It is dropped when the topic is given and salient.
- The derivation of  $\emptyset$ <sub>topic</sub> involves the syntax-discourse interface in the sense that its derivation not only calls for syntactic derivation of topicalisation, but also discourse information that determines whether the topicalised element can delete. Specifically, *Lisi* cyclically moves to Spec TopicP at syntax, but its final deletion at Spec TopicP is due to discourse saliency.

- Zhao (2012a, 2012b) also identifies  $\emptyset$ ziji in Chinese.  $\emptyset$ ziji is derived from deletion of the bare reflexive ziji as a defective goal of its antecedent.
- $\emptyset$ ziji is not allowed here as it is impossible for the null element to form an Agree relation with the other sentential subject, its potential antecedent.
- I argue that the null subjects are  $\emptyset$ topic. Their derivation involves the syntactic derivation of topicalisation of the subject and its subsequent deletion as a piece of old information in the discourse.
- Zhao (2012a, 2012b) proposed that the Chinese C rather than T probes the subject in its base generation position at Spec vP.
- One of the implications of this proposal is that Chinese subjects can be topicalised while English ones are stuck at Spec TP and cannot be topicalised (Rizzi and Shlonsky 2007). As the other sentential subject in complex sentences is normally the salient topic in the discourse in which the sentence appears, the null subject is generally coreferential with it.
- Zhangsan<sub>i</sub> chi wanfan de shihou, ta<sub>i</sub>/e<sub>i</sub> dai zhe yi ding maozi.

...<sub>[TopP</sub> Zhangsan...<sub>[CP</sub> Zhangsan [<sub>vP</sub> Zhangsan...]]]

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**Backward anaphora****Forward anaphora****Null****Ta****Null****Ta**

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**Coref(erential)** $\checkmark$ **X** $\checkmark$  $\checkmark$ **Disj(oint)****X** $\checkmark$ **X** $\checkmark$ 

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# Previous studies

- Sorace and Filiaci (2006) investigate anaphora resolution in English-speaking learners' L2 Italian.

a. Mentre lei<sub>k/l</sub>/*pro*<sub>i</sub> si mette il cappotto, la mammai dà un bacio alla figlia<sub>k</sub>.

while she wears the coat, the mother gives a kiss to the daughter

'While she/*pro* is wearing her coat, the mother kisses her daughter.'

b. La mammai dà un bacio alla figliak mentre lei<sub>k/l</sub>/*pro*<sub>i</sub> si mette il cappotto.

the mother gives a kiss to the daughter, while she wears the coat

'The mother kisses her daughter, while she/*pro* is wearing her coat.'

(Sorace and Filiaci 2006: 352)

# Previous studies: Sorace and Filiaci (2006)

anaphora resolution in English-speaking learners' L2 Italian.

- a. Mentre lei<sub>k/l</sub>/*pro*<sub>i</sub> si mette il cappotto, la mammai dà un bacio alla figlia<sub>k</sub>.  
while she wears the coat, the mother gives a kiss to the daughter  
'While she/<sub>pro</sub> is wearing her coat, the mother kisses her daughter.'
- b. La mammai dà un bacio alla figliak mentre lei<sub>k/l</sub>/*pro*<sub>i</sub> si mette il cappotto.  
the mother gives a kiss to the daughter, while she wears the coat  
'The mother kisses her daughter, while she/*pro* is wearing her coat.'

(Sorace and Filiaci 2006: 352)

# Sorace and Filiaci (2006)

- The Position of Antecedent Strategy (PAS, Carminati 2005): a null pronoun has a strong bias towards an antecedent in Spec-IP (normally, the subject), whereas an overt pronoun prefers an antecedent lower in the structure (e.g. the object).
- Sorace and Filiaci emphasise that PAS belongs to the syntax-discourse interface rather than the syntax proper, as the violation of the PAS results in pragmatically inappropriate sentences instead of grammatically illicit ones.
- a Picture Verification Test
- The near-native speakers behaved like native speakers in interpreting *pro* in both forward and backward anaphora contexts. This suggests that near-native speakers have a null-subject grammar and respect PAS.
- Although L2 learners correctly interpreted the overt pronoun in forward anaphora, they differed from native speakers in interpreting it in backward anaphora. The native speakers strongly preferred an extralinguistic referent for the overt pronoun in backward anaphora. The learners chose the subject of the main clause as the referent for the overt pronoun significantly more often than the native speakers. The PAS does not explain why the extralinguistic referent is the preferred antecedent for the overt pronoun in backward anaphora. Sorace and Filiaci did not provide a clear explanation for this.

# Sorace and Filiaci (2006)

- This type of anaphora is particularly costly in terms of processing: the parser is biased to choose the subject of the main clause as the antecedent in an attempt to find an antecedent for the overt pronoun as soon as possible;
- However, PAS is biased against the overt pronoun referring to the subject.
- They claim that near-native speakers do not have sufficient processing resources to choose an extrasentential entity from the discourse as the referent of the overt pronoun.

# Conceptual problems with Sorace and Filiace (2016)

- They argue that PAS is at the syntax-discourse interface.
- If the syntax-discourse interface generally involves the higher processing cost of accessing and integrating syntactic and discourse representations and thus may result in residue optionality, it should be true of PAS for both null and overt pronouns.
- However, near-native speakers have acquired PAS for pro at the syntax-discourse interface.
- the residue optionality regarding the overt pronoun is actually due to the conflict between PAS and learners' strategy to find a referent for the overt pronoun as soon as possible. ---PAS at the syntax-discourse interface is only part of the reason for the high processing demand involved in the interpretation of the overt pronoun.
- In a way, the results here seem to indicate some syntax-discourse interface properties (e.g. PAS for pro) are acquirable whereas others (e.g. PAS for the overt pronoun) are not.

## Other relevant studies

- Kraš (2008) found that anaphora resolution of both null and overt pronouns in sentences was target-like in L2 Italian grammars of Croatian learners in a picture selection task. Kraš argues that positive L1 transfer may have contributed to the successful acquisition here. As in Italian, *pro* is allowed in Croatian. Additionally, *pro* tends to take a subject antecedent in intra-sentential anaphora, whereas the overt pronoun tends to take a non-subject antecedent.
- Lust et al. (1996) conducted a study on the L1 acquisition of the overt pronoun and the null element in Chinese complex sentences by using a Truth Value Judgement task with pictures.
  - Chinese children of all five age groups (3;0-7;6) consistently allowed the coreferential reading of *ta* in backward anaphora whereas the Chinese adults did not.
  - Although the disjoint reading is grammatically possible for *ta* in forward anaphora, both the adults and children seemed to be indeterminate about it.
- Zhao (2011, 2012a) investigates the representation and interpretation of *ta* and the null element in the argument positions of embedded object clauses in Chinese with a PJT.
  - L2 learners have interpreted *ta* correctly in the embedded argument positions by the high-intermediate state.
  - $\emptyset$ topic has been acquired earlier in the embedded object position than in the embedded subject position, but L2 learners have acquired the representation and interpretation of  $\emptyset$ topic in both positions by the advanced state.

- PAS cannot account for the interpretation of the Chinese *ta*.

→ First, the other sentential subject is not the preferred antecedent for the Italian overt pronoun in either forward or backward anaphora. By contrast, the coreference between the Chinese *ta* and the other sentential subject is only prohibited in backward anaphora. It is allowed in forward anaphora.

→ Second, the coreference between *ta* and the subject of the main clause in backward anaphor leads to a grammatically unacceptable sentence rather than a pragmatically inappropriate one as is the case with Italian. This suggests that a syntactic violation occurs in line with Sorace and Filiaci (2006).

## *Research questions and hypotheses*

- Will English-speaking learners acquire the native-like competence in interpreting the overt pronoun *ta*? In particular, will they be aware of the cyclic-c-command condition so that they reject the coreferential reading of *ta* in backward anaphora and accept it in forward anaphora?
- Will English-speaking learners acquire  $\emptyset$ topic in these positions?

# Participants

Group	No. of subjects	Average age	Average no. of years learning Chinese	Average no. of years in Mainland China/Taiwan	Mean scores in the cloze test (n=40)	
					M	SD
L2	15	34.9	16.6	4.4	37.1	1.2
NS	14	30.4	n/a	n/a	38.3	1.5

( $t(27) = 1.920, p = 0.065$ ); The experimenter also informally tested the learners' proficiency in her conversation with them to complement the results of the proficiency test, paying attention to their accuracy, fluency, and appropriateness of lexical choices. The L2 learners included here could possibly pass as near-native speakers, although even stricter and more formal criteria were not applied due to practical reasons.

# *Materials and procedures*

- a proficiency cloze test (Yuan 1993)
- an acceptability judgement task (AJT): 24 sentences, of which 12 were test sentences

→ Sub(ordinate)-Null; Sub-Null-*le*; Sub-*yao*-Null; Main-Null

e.g. ting le zhixie hua yihou, Li Gang ku le.

hear Perf these words after Li Gang cry PFV

‘After hearing these words, Li Gang burst into tears.’

-2 -1 0 1 2

- a picture judgment task (PJT).

# The PJT

- The PJT consisted of 44 context-providing pictures, each accompanied by one sentence to be marked on a five-point rating scale ranging from -2 to 2.
- 24 experimental sentences, 8 sentence types; variables: direction of the anaphora (forward vs. backward); NP type: (*ta* vs. the null element); and reading (i.e., the type of picture: coreferential vs. disjoint).



- All the sentences were composed of simple vocabulary about everyday life. The same set of lexicalisation was used for the reading and NP type variables.
- There were also twenty filler items that were random sentences and had nothing to do with the current study.
- The task had a balanced number of coreferential pictures and disjoint pictures.
- The number of appropriate and inappropriate sentences was also balanced in the task.
- All the test items were randomised.

Type	
1) Null+Coref+FW	The sentence is intended to describe a picture that depicts a forward anaphora situation (FW) where the null element in the subject position of the main clause needs to be coreferential with the subject of the subordinate clause.
2) *Null+Disj+FW	The sentence is intended to describe a picture that depicts a forward anaphora situation where the null element in the subject position of the main clause needs to refer to an entity other than the subordinate subject.
3) Null+Coref+BW	The sentence is intended to describe a picture that depicts a backward anaphora situation (BW) where the null element in the subject position of the subordinate clause needs to be coreferential with the subject of the main clause.
4) *Null+Disj+BW	The sentence is intended to describe a picture that depicts a backward anaphora situation where the null element in the subject position of the subordinate clause needs to refer to an entity other than the subject of the main clause.
5) Ta+Coref+FW	The sentence is intended to describe a picture that depicts a forward anaphora situation where <i>ta</i> in the subject position of the main clause needs to be coreferential with the subject of the subordinate clause.
6) Ta+Disj+FW	The sentence is intended to describe a picture that depicts a forward anaphora situation where <i>ta</i> in the subject position of the main clause needs to refer to an entity other than the subordinate subject.
7) *Ta+Coref+BW	The sentence is intended to describe a picture that depicts a backward anaphora situation where <i>ta</i> in the subject position of the subordinate clause needs to be coreferential with the subject of the main clause.
8) Ta+Disj+BW	The sentence is intended to describe a picture that depicts a backward anaphora situation where <i>ta</i> in the subject position of the subordinate clause needs to refer to an entity other than the subject of the main clause.

# Mean scores for the AJT

- Both native speakers and L2 learners accept null subjects in subordinate and main clauses. Independent samples *t*-tests produce no significant difference between the NS group and the L2 group in any of the four sentence types. This indicates that L2 learners allow null elements in the subject position of the subordinate clause and that of the main clause in a native-like way.

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Subject groups	L2	NS
Sub-Null	1.48	1.64
Sub-Null- <i>le</i>	1.21	1.57
Sub- <i>yao</i> -null	1.39	1.67
Main-Null	1.67	1.36

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# Mean scores for the PJT

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	L2		NS	
	M	SD	M	SD
Null+Coref+FW	1.69	0.48	1.95	0.18
*Null+Disj+FW	-1.8	0.37	-1.52	0.57
Null+Coref+BW	1.76	0.34	1.74	0.40
*Null+Disj+BW	-1.47	0.45	-1.36	0.66
Ta+Coref+FW	0.93	1.15	1	0.64
Ta+Disj+FW	0.33	1.56	0.45	1.57
*Ta+Coref+BW	0.67 <sup>†</sup>	1.38	-1.17	0.73
Ta+Disj+BW	0.96	1	1	0.78

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# The null element

- A factorial ANOVA with repeated-measures comparing direction of the anaphora and reading by group shows a significant effect for reading ( $F(1, 27) = 1474.182$ ,  $p < .001$ ).
- A significant effect was also found in the interaction between direction and reading ( $F(1, 27) = 5.121$ ,  $p = .032$ ).
- The coreferential reading is higher than the disjoint reading for the null element in both forward and backward anaphora. The L2 learners and native speakers alike accept the coreferential reading but reject the disjoint reading of the null element in both forward and backward anaphora.
- Independent samples t-test produces no significant difference between the L2 and the NS groups with regard to Null+Coref+FW, Null+Disj+FW, Null+Coref+BW or Null+Disj+BW.
- The results indicated that the L2 learners have acquired native-like competence in accepting the coreferential reading and rejecting the disjoint reading of the null element in both forward and backward anaphora.

# *ta*

- The factorial ANOVA with repeated-measures reveals a significant effect for direction ( $F(1, 27) = 7.380, p = 0.11$ ), with higher scores for forward anaphora than backward anaphora regarding the coreferential reading and lower scores for forward anaphora than backward anaphora regarding the disjoint reading.
- There are also significant differences between direction and group ( $F(1, 27) = 18.025, p < .001$ ), between direction and reading ( $F(1, 27) = 36.082, p < .001$ ) and also between direction, reading and group ( $F(1, 27) = 9.261, p = .005$ ).
- Independent samples t-tests produce a significant difference between the L2 group and the NS group on Ta+Coref+BW ( $t = 4.473, p < .001$ ), but no significant difference on Ta+Coref+FW, Ta+Disj+FW or Ta+Disj+BW.
- Both native and L2 speakers show a strong tendency to allow or allow the coreferential reading of *ta* in forward anaphora and its disjoint reading in backward anaphora.
- Both native speakers and L2 learners seem to be indeterminate about the disjoint reading of *ta* in forward anaphora, although this reading is grammatically possible (among others, Lust et al 1996). Similar findings have also been reported in Lust et al. (1996).

# Individual results for Ta+Disj+FW

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	Full acceptance (3/3)	Partial acceptance (2/3)	No acceptance/full rejection
L2 (15)	8(53.3%)	3 (20%)	4(26.7%)
NS (14)	6 (42.9%)	5 (35.7%)	3(21.4%)

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# Individual results for \*Ta+Coref+BW

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	Full (3/3)	rejection Partial (2/3)	rejection	No rejection/full acceptance
L2 (15)	3(20%)	2 (13.3%)		10 (66.7%)
NS (14)	9 (64.2%)	5 (35.7%)		0

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# Individual results for \*Ta+Coref+BW

- All native speakers consistently reject Ta+Coref+BW.
- Only five of the L2 learners consistently reject this type of sentence whereas ten showed no rejection.
- These ten highly proficient speakers accept all the three tokens of Ta+Coref+BW, i.e. they show a pattern of ‘full acceptance’.
- A careful examination of the individual data shows that four out of the five L2 learners who consistently reject Ta+Coref+BW are also consistent in incorrectly rejecting Ta+Coref+FW.
- The results indicate that the L2 learners have not acquired the cyclic c-command condition of *ta*.

# Discussion

- A brief summary of the findings

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		Backward anaphora		Forward anaphora	
		Null	Ta	Null	Ta
L2	Coref	✓	??	✓	✓
	Disj	X	✓	X	?✓
NS	Coref	✓	X	✓	✓
	Disj	X	✓	X	?✓

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# Discussion: null elements

- The highly proficient learners correctly allow the null element to appear in the subject position of the subordinate clause.
- In particular, they allow null subjects to appear in the subordinate clauses with the aspect marker *le* and modal *yao* which are finite clauses according to Huang (1989).
- This may indicate that they accept null subjects in finite subordinate clauses in their L2 Chinese.
- Due to the lack of inflectional changes in Chinese, we cannot rule out the possibility that highly proficient learners accept these sentences based on the sentences in the next slide in their L1.

# Discussion: null elements

- a. When singing, Li Hong is wearing a white dress.  
b. After having heard these words, Li Gang burst into tears.  
c. When (being) about to go out, Xiao Li remembered that he did not bring his wallet.
  - Nonetheless, the results show that the highly proficient learners also correctly accept null subjects in main clauses, which is not allowed in their L1.
- \*‘When Xiao Zhang is eating, *e* is wearing a pretty necklace.’
- This unequivocally indicates that they accept null subjects in finite clauses.
  - This result is consistent with the findings of Yuan (1993) and Zhao (2011, 2012a) that null subjects are allowed in finite clauses in L2 grammars of English-speaking learners by the advanced state. If highly proficient learners have acquired that null subjects are allowed in finite clauses in Chinese, it is highly possible that they do not need to rely on their L1 grammar to sentences with null elements in the finite adverbial clauses.

# Discussion: null elements

- The results from the PJT show that highly proficient learners behave like native speakers and interpret the null element as referring to the other sentential subject in both forward and backward anaphora.
- These null elements are  $\emptyset_{\text{topic}}$ s, derived from deletion of the topicalised subjects as a piece of old information in the discourse. Given the assumption, the results may indicate that the highly proficient learners have acquired  $\emptyset_{\text{topic}}$  at the syntax-discourse interface.
- It is not possible that the null elements are treated as null Chinese equivalents of the English pronouns.
  - The highly proficient learners do not allow the same readings for the null element as they do for *ta*.
  - It has been found that English-speaking learners have become aware that null pronouns are not allowed in Chinese by the advanced state (Zhao 2012a).
- The result that  $\emptyset_{\text{topic}}$  seems to have been acquired by the highly proficient speakers here is consistent with Zhao (2011, 2012a) who found that  $\emptyset_{\text{topic}}$  had been acquired in other sentence positions by English-speaking learners by the advanced state.
- It is not surprising that  $\emptyset_{\text{topic}}$  can be acquired in L2 Chinese. There is plenty of evidence in the input data to show that null elements can be used to refer to a discourse entity in Chinese. In terms of representation, the acquisition of  $\emptyset_{\text{topic}}$  in the subject position takes subject topicalisation and the Topic NP Deletion Rule as preconditions. Independent evidence in the literature indicates that these preconditions have been acquired by English-speaking learners by the advanced state (see Yao 2007; Zhao 2008, 2012a for details).

# Discussion: null elements

- The acquisition of  $\emptyset_{\text{topic}}$  provides further evidence to the claim that some aspects at the syntax-discourse external interface are acquirable (Ivanov 2012; Iverson et al. 2008; Kraš 2008; Rothman 2007, 2009; Slabakova et al. 2012; Slabakova and Ivanov 2011; Zhao 2008, 2012a).
- The current study supports the proposals of White (2011) and Yuan (2010) that interface vulnerability may not be domain-wide in that  $\emptyset_{\text{topic}}$  at the syntax-discourse interface is acquired in comparison with some syntax-discourse properties that have proved to be vulnerable to ultimate fossilisation as discussed in Sorace and Filiaci (2006), among others.
- This result can also be considered as consistent with the IH. The IH does not rule out the possibility that properties at the syntax-discourse interface may be acquirable.

# Discussion: *ta*

- Highly proficient learners behave like native speakers regarding the disjoint reading of *ta* in backward anaphora.
- Individual analysis show that over 70% of native speakers and L2 learners consistently accept this type of reading, despite the mean scores for both groups being around '0'. This indicates that the majority of native speakers and L2 learners accept the disjoint reading of *ta*, although there is some degree of indetermination.
- Lust et al. (1996) also found that the grammatical disjoint reading of the Chinese *ta* was not readily accepted by their adult native speakers.

- What causes the indetermination in both native grammars and end-state L2 grammars?
- I argue that the indetermination may be related to the fact the subject of the temporal clause is readily accessible as the referent. Syntactically, the subject of the temporal clause is not in the governing domain of *ta* and thus qualifies as a possible referent of *ta*. Semantically, the test sentences adopt activity verbs in the temporal sentence and verbs with continuous aspect in the main clause as, thus supporting the coreferential reading of *ta*. In addition, coreferential reading of *ta* may be less costly than the disjoint reading as below.
- Processing is subject to the economy principle (*inter alia*, Weinberg 1999).
- If both intrasentential and extrasentential dependencies are available, the processor initially establishes an intrasentential dependency (cf. Burkhardt 2005).
- Processing of the disjoint reading involves an extra processing load of accessing a discourse representation of the previous sentence, where the antecedent may be found. Thus the coreferential reading is less costly than the disjoint reading in terms of processing.
- It has been noted that recency plays an important role in anaphor resolution (e.g. Lappin and Leass 1994).
- Sorace and Filiaci also note that it is a 'well-known preference for finding pronoun antecedents within the clause', rather than 'going outside the sentence' (2006: 359).
- Mitkov (2002) points out that a noun phrase in the previous clause of a complex sentence is the best antecedent candidate for an anaphor in the subsequent clause.
- With the subject of the temporal sentence being instantly available as the possible referent of *ta*, some participants may not be motivated to search for another referent for *ta* in the discourse.

# Discussion: *ta*

- Sorace and Filiaci (2006) argue that near-native English-speaking learners of Italian may have insufficient processing resources to take a referent from the discourse as an antecedent for the overt pronoun in backward anaphora in their L2 Italian grammars.
- Unlike the Italian data in Sorace and Filiaci, the disjoint reading of the Chinese *ta* is fully acceptable in the highly proficient English-speaking learners' L2 Chinese.
- The lack of sufficient processing resources may not be the reason for the non-acquisition of the disjoint reading of the overt pronoun in Italian.
- Otherwise, this should also be true of the disjoint reading of *ta*. Highly proficient learners of Chinese would have been unable to relate *ta* to a discourse entity, contrary to the fact.

## Discussion: *ta*

- The highly proficient learners behave like native speakers in accepting the coreferential reading for *ta* in forward anaphora, but they fail to correctly reject it in backward anaphora.
- This indicates that they have not acquired the cyclic-c-command condition, contra the predication made in line with the IH.
- The Chinese overt pronoun abides by a stricter syntactic condition than the English one: the cyclic-c-command condition. In backward anaphora, *ta* cyclic c-commands the subject of the main clause, and hence it cannot refer to the latter. This cyclic-c-command condition is internal to the syntax proper.
- 66.7% of the highly proficient learners fully allow the coreferential reading of *ta* in backward anaphora.
- This seems to reflect influence from their L1 English. In the L2 grammars of these highly proficient learners, *ta* is only restricted by the constraint on the overt pronoun in their L1. As long as *ta* does not c-command an NP, it can take the latter as its antecedent. In either forward or backward anaphora, the other sentential subject is not in the c-commanding domain of *ta*. These highly proficient learners allow *ta* to refer to the other sentential subject, although *ta* cyclically c-commands the latter in backward anaphora.

- Five of the L2 learners consistently reject the coreferential reading of *ta* in backward anaphora.
- Does this mean they have acquired the cyclic-c-command condition?
- Unlike the native speakers, four of these five L2 learners also reject the coreferential reading of *ta* in forward anaphora.
- Interestingly, the disallowance of the coreferential reading in both forward and backward anaphora seems to resemble the Italian overt pronoun, which tends not to take the other sentential subject as its referent in either backward or forward anaphora below (Cardinalette and Starke 1994; Fernández-Soriano, 1989). As in Italian, L2 learners seem to have avoided the use of the overt pronoun in ‘unmarked situations, i.e. where the referent is prominent in the discourse’ (Cardinaletti and Starke 1994: 49). As argued before, the other sentential subject in the complex sentences is normally the topic of the discourse, hence its prominence in the discourse.

a. ???Quando lui<sub>i</sub> è arrivato a casa, Gianni<sub>i</sub> ha telefonato.

when he is arrived at home Gianni has called.

b. ???Gianni<sub>i</sub> ha telefonato quando lui<sub>i</sub> è arrivato a casa.

Gianni has called when he is arrived at home.

(Adapted from Cardinaletti and Starke 1994: 68)

# Why is the fossilisation?—input

- Could it be explained by the absence of triggering positive evidence in the L2 Chinese input data in terms of the interpretational constraint of the pronoun *ta*?
- The English overt pronoun obeys a more relaxed condition in taking possible referents. It can refer to an antecedent as long as it does not c-command the latter.
- The Chinese *ta* cannot take a referent if it cyclic c-commands the latter. The cyclic-c-command relation properly includes the c-command relation. As a result, there is no positive evidence in the L2 Chinese input data to inform English-speaking learners that the Chinese *ta* cannot refer to an NP that it cyclic c-commands.
- This lack of positive evidence might have resulted in highly proficient speakers' failure to reject the coreferential reading of *ta* in backward anaphora.

# What about the L1 acquisition?

- The account runs into difficulties when we take the L1 data into consideration.
- Lust et al. (1996) find that the monolingual L1 Chinese children also accept the coreferential reading of *ta* in both forward and backward anaphora. The absence of positive evidence also exists in L1 acquisition of this aspect. L1 learners can ultimately arrive at the native Chinese grammar, which diverges from the fossilisation of highly proficient L2 learners in this respect.
- If the absence of positive evidence is the only reason that underlies the non-convergence of L2 Chinese grammars, why L1 Chinese learners ultimately acquire the cyclic-c-command condition remains unexplainable.

what makes the cyclic-c-command condition  
acquirable to the L1 learner but not to the L2 learners  
in the absence of positive evidence?

- Chomsky (1995) argues that parametric differences across languages are limited to the lexicon, i.e., to the functional categories in the lexicon.
- Accordingly, it may be possible to conceptualize the cyclic-c-command condition that leads to the parametric difference between Chinese and English as a [+cyclic-c-command] feature on the pronominal D.
- The [+cyclic-c-command] feature is an uninterpretable functional feature because it does not affect the lexical composition of *ta*.
- The existence of such a feature does not change the lexical form of *ta* as a third person singular pronoun.
- It is not a feature relevant to the lexicosemantic constitution of an element (Spyropoulos 2005), or 'required for the assembly of lexical items' (Hawkins and Harroti 2006: 271).
- When the pronominal D head has a [+cyclic-c-command] feature, it cannot refer to an NP it cyclic c-commands. The English *he/she* does not have such a feature, whereas the Chinese *ta* has such a feature. Thus *ta* cannot refer to the subject of the main clause in backward anaphora, as it cyclically c-commands the latter. *He/she* can still refer to the subject of the main clause in backward anaphora, as it does not have such a feature.

- If the conceptualization of a [+cyclic-c-command] feature is feasible, the different outcomes of L1 Chinese acquisition and L2 Chinese acquisition described above seem to support different versions of the claim that there is representational deficit within narrow syntax in L2 acquisition. (Hawkins 2003; Tsimpli and Dimitrakopoulou 2007; Hawkins and Chan 1997; Hawkins and Hattori 2006).
- Adult L2 grammars fossilise when functional uninterpretable features that are not instantiated in learners' L1 are required.
- The English pronominal D does not have the [+cyclic-c-command] feature. This feature is not instantiated in English-speaking learners' L1. As a result, it is no longer accessible to adult English-speaking learners of Chinese. Even highly proficient learners are unaware that *ta* cannot refer to an NP when its minimal cyclic node c-commands the NP.

- The ultimate fossilisation of purely syntactic categories in L2 acquisition has also been reported in Coppieter (1987), Sorace (1993) and Kraš (2011).
- The ultimate fossilisation of narrow syntactic properties reported in previous studies and the current study may suggest that the ultimate success of the purely syntactic categories cannot be generalised across the board in L2 acquisition, just as interface vulnerability may not be domain-wide (White 2011; Yuan 2010).
- The learnability of the purely syntactic categories is also influenced by variables such as the nature of the category, crosslinguistic difference and input.

# Conclusion

- It has shown that the cyclic-c-command condition within narrow syntax is not acquirable, whereas  $\emptyset$ topic at the syntax-discourse external interface properties is acquirable.
- These findings are not fully consistent with the predictions of the IH.
- This study provides supporting evidence to the claim that the (non-)acquirability of a particular interface cannot be generalised (White 2011; Yuan 2010).
- Furthermore, it shows that L2 learners' success in the acquisition of the syntactic categories cannot be assumed in a domain-wide fashion.

# Implications for teaching: Implicit vs. explicit knowledge

- Second language researchers assume a distinction between 'learned' or 'explicit' knowledge (i.e., deliberate, consciously controlled type of linguistic knowledge) and 'acquired' or 'implicit' knowledge (i.e., intuitive, automatic type of linguistic knowledge (e.g. Whong et al. 2014; R. Ellis 2005)).
- Explicit knowledge does not *become* implicit knowledge nor can it be *converted* to it. (N. Ellis 2005: 307)
- Explicit data and ND [negative data] help to create another type of knowledge, one that should be seen as distinct from competence; whereas explicit data and negative data effect LLK [learned linguistic knowledge], they do not effect competence. (Schwartz 1993: 160)
- implicit knowledge is considered to be superior than explicit knowledge (Whong et al. 2013b). implicit knowledge is automatic, fast and lasting.
- The best way to demonstrate the effectiveness of instruction is if learners can be shown to have implicit knowledge of the linguistic phenomena under study, and not just explicit knowledge.
- Some researcher hold that explicit knowledge can become implicit over time and with practice (e.g. DeKeyser 2007).
- Explicit instruction could facilitate both explicit and implicit knowledge of syntactic and semantic properties of language (e.g. Slabokova 2008; Spada and Tomita 2010; Toth and Guijarro-Fuentes 2013; Yusa 2011).

# How?

- Valenzuela and McCormack investigated what is taught in L2 Spanish classrooms with regard to topic-comment constructions and clitics, and then they examined some data from English-speaking learners of Spanish
- They found that topic-comment constructions are rarely taught, whereas instruction is commonly provided about clitic pronouns and their placement. However, the instruction about clitics does not include their interpretation in terms of the link between the topic and the wider context.
- The results indicate that learners are aware that the structures under investigation are grammatical, but they are less successful in interpreting the structures appropriately in given contexts. In other words, classroom exposure, including explicit instruction, seems to have facilitated L2 acquisition of the structure of topic-comment constructions with and without clitics; but interpretation, which the learners have not been taught about, remains unacquired.
- Valenzuela and McCormack propose that classroom instruction could usefully include more focus on syntax-discourse phenomena.
- they suggest that examples be provided of target constructions within a wider context, with explicit explanation of why one given construction is chosen over another. Such instruction could facilitate understanding of required discourse notions such as topic and focus, which could lead to mastery of target properties that interface with discourse.

# How

- Yusa's (2011) study indicates that classroom-based L2 instruction in EFL settings can cause changes in the brains of postpuberty learners (Sakai et al., 2009; Osterhout et al., 2008; Tatsuno & Sakai, 2005; McLaughlin, Osterhout, & Kim, 2004), supporting the view that the brain remains plastic or "trainable" through life, at least in some domains (Blakemore & Frith, 2005).
- L2 learners can acquire more syntactic knowledge than has been instructed, which suggests the possibility that L2 acquisition is guided by the interplay of nature (genetics, endowment, UG) and nurture (environment, instruction, learning), not by the unfortunate classic dichotomy "nature versus nurture."
- It also shows that at least the core principle (i.e., structure dependence) in the computational system of syntax proper still functions after critical period.

# How?

- Never will I \_\_\_\_ eat sushi.
- \* Never will [those students who \_\_\_\_\_ fail a test] are hardworking in class
- Never are [those students who will fail a test] \_\_\_\_\_ hardworking in class
- Participants in the instruction group met twice a week for one month (8 classes in total), with one training session lasting an hour in addition to their regular classes, and were required to hand in assignments based on the training sessions.
- No instruction was given to the instruction group with regard to complex sentences containing relative clauses (e.g., Those students who are very smart are never silent in class), which the structure-dependent rule can deal with but the structure-independent one cannot. In contrast, the non-instruction group received no instruction whatsoever

# How?

- Rothman (2008): Competing Systems Hypothesis: some (divergent) L2 performance behavior, even at the highest levels of L2 proficiency, can be explained by a competition of separate L2 mental linguistic systems.
- The proposed two grammars are the system of underlying grammatical competence for the L2 and a separate system of learned metalinguistic knowledge, learned explicitly via classroom teaching. The first system is assumed to obtain on the basis of available target input and its interaction with UG5. The second system is the byproduct of explicit training in the L2, given specifically designed pedagogical explanations.

- Pedagogical grammars are grammars of the type offered in any foreign language textbook for non-native speakers and the ones that are advanced by L2 teachers. These are the types of rules that the CSH warns can be imprecise. Pedagogical grammar rules are not natural rules, but rather are compiled on the basis of two things: (a) non-linguistic, surface-level descriptions of the target L2 grammar and (b) purposeful design grounded in direct and indirect comparisons between the target L2 language and the native language of the audience.
- Descriptive grammars seek to describe what can be observed in the speech of native speakers and what native speakers may intuit as possible and impossible sentences of their native language through judgments.

# Implications of the current study on teaching (for discussion)

- Null elements are different from overt pronouns.
- $\emptyset$ topic: Acquirable. Reasonable expectations. Full acquisition at the advanced state
- Provide subject topicalisation sentences and call the learners attention to them.
- Topic deletion Rule
- Ta is different from he  
Negative evidence.